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Service and
Reliability
Survey: How
PC Vendors Rate

QuarkXPress and
FrameMaker
Redesign High-End
Desktop Publishing

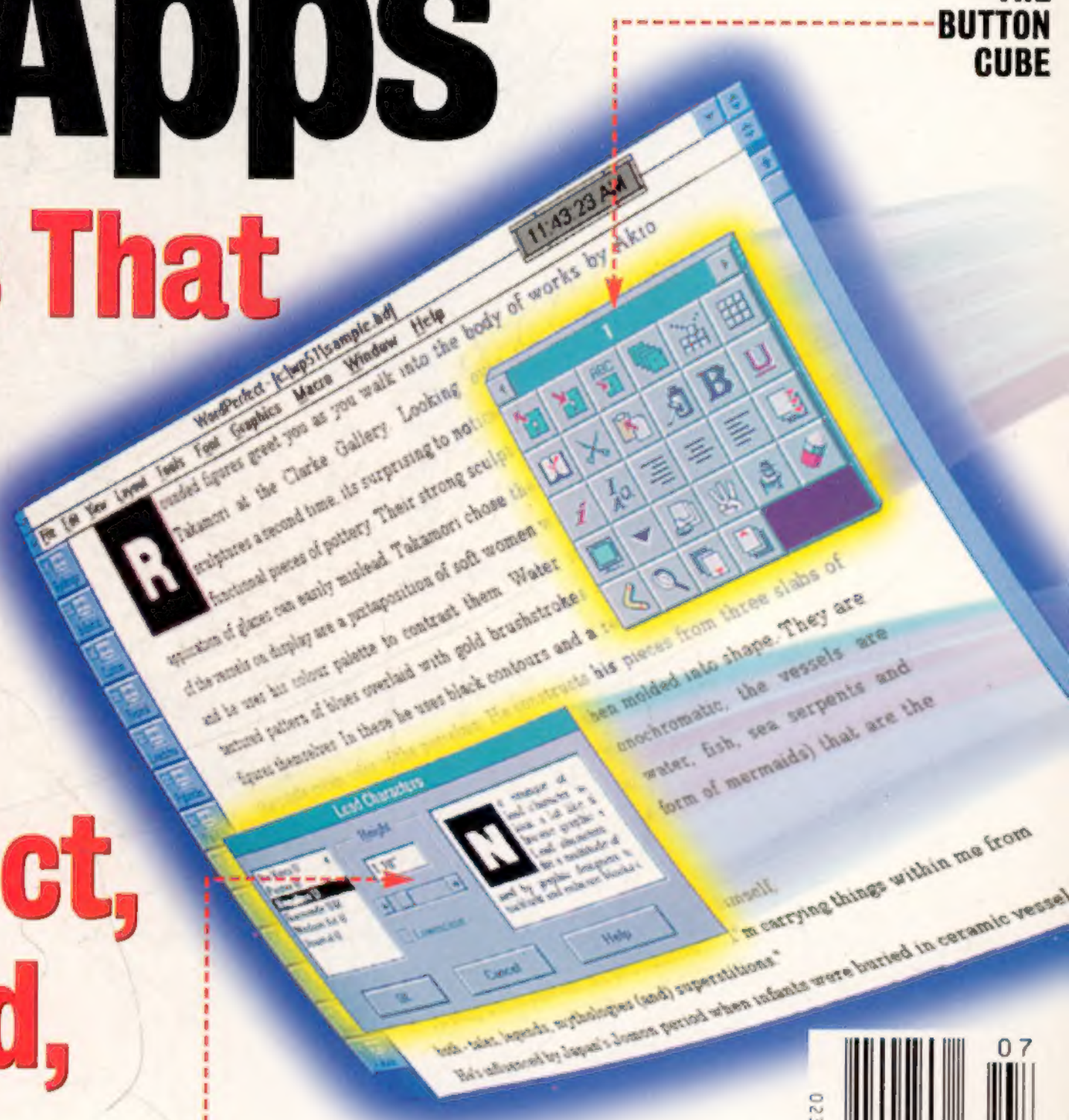
Network
Schedulers: Have
Your Computer
Call My Computer

PC Labs Tests 43
Ethernet Cards:
Fast, Economical
Connections

Supercharging Your Apps

THE
BUTTON
CUBE

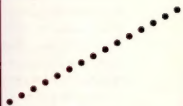
48 Add-Ins That
Increase
The Power
Of 1-2-3,
WordPerfect,
Excel, Word,
And Others

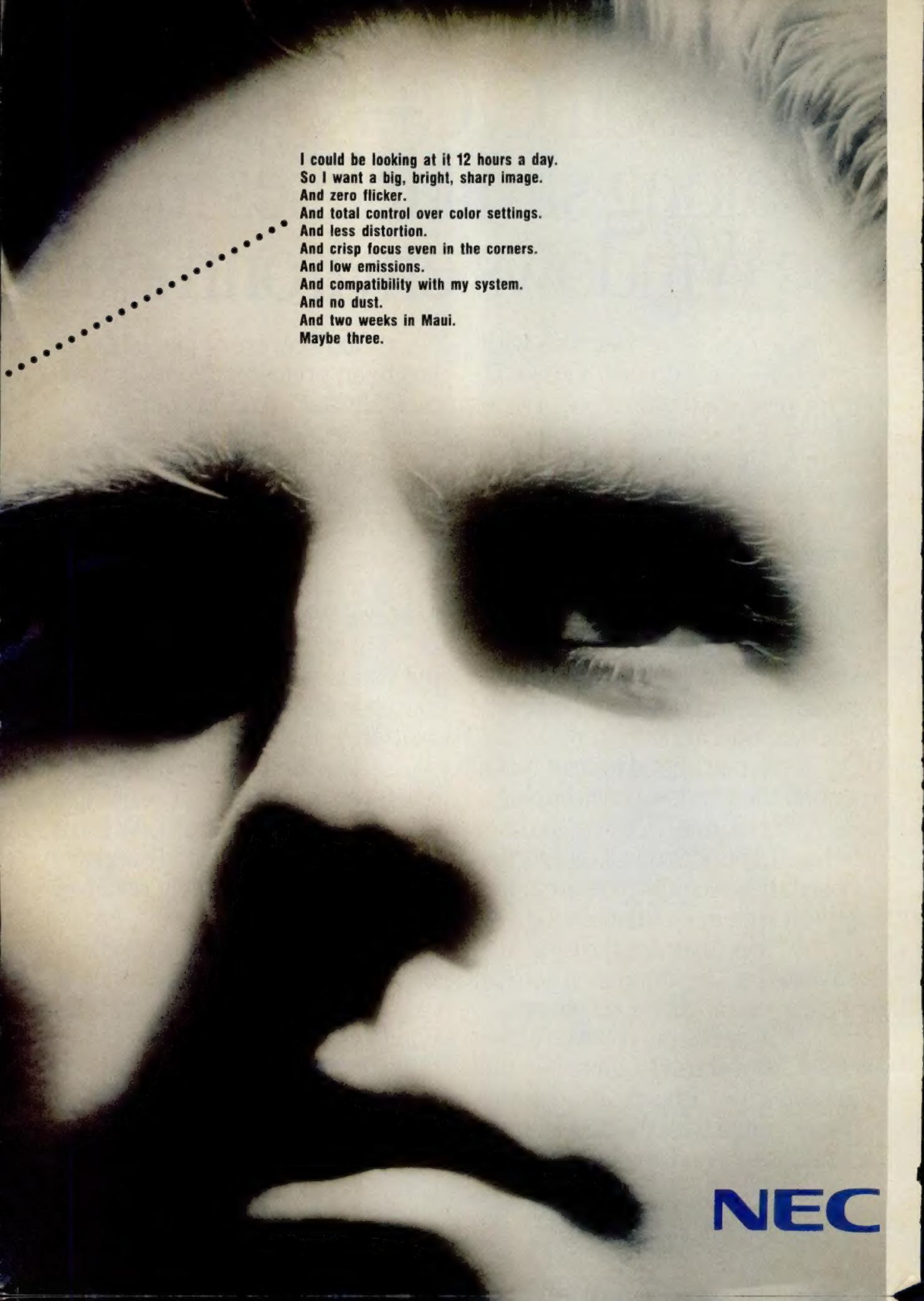


BY DESIGN
FOR WINDOWS



**It's as if
we
monitored
your
thoughts.**





I could be looking at it 12 hours a day.
So I want a big, bright, sharp image.
And zero flicker.
And total control over color settings.
And less distortion.
And crisp focus even in the corners.
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And two weeks in Maui.
Maybe three.

NEC

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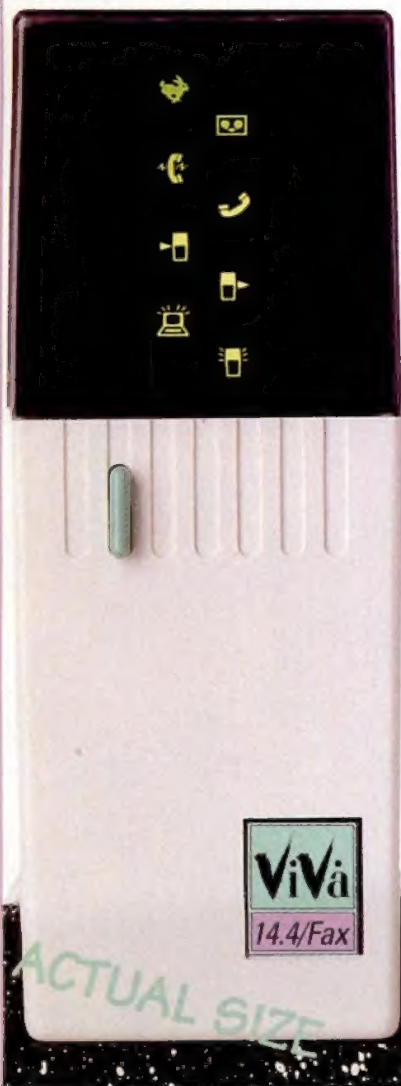
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CIRCLE 105 ON READER SERVICE CARD

Inside

If you've read our reviews or seen our benchmark test results for a particular model of computer, you have a very good idea what performance you will get before you ever turn the machine on. But what happens

when something goes wrong, or when you need help solving a technical problem? As computers become increasingly standard, product quality and service become differentiating factors between vendors.

When we ran our first Service and Reliability survey two years ago (September 25, 1990), the response from readers was over-

on customer satisfaction in this issue. We mailed out 17,000 questionnaires to randomly selected subscribers, and we tabulated the results after we got a 50-percent response. We required a minimum of 50 responses to rate a vendor.

As you can imagine, our service and reliability ratings are eagerly awaited by many of the manufacturers in the industry. Some rejoice because their efforts to improve service and support are noticed. Some despair, because you—their customers—are not as happy as they would like. The smart ones redouble their efforts and the result is better service and improved reliability for all of us.

We believe that service and reliability factors are important in choosing a system, which is why we'll run survey results with all future comparative PC reviews. We'll conduct a survey every six months because the industry changes so quickly. So if you get one of our questionnaires, please respond: It's the best way we know of letting vendors—and other readers—know how the machines stack up.

—Joel Dreyfuss

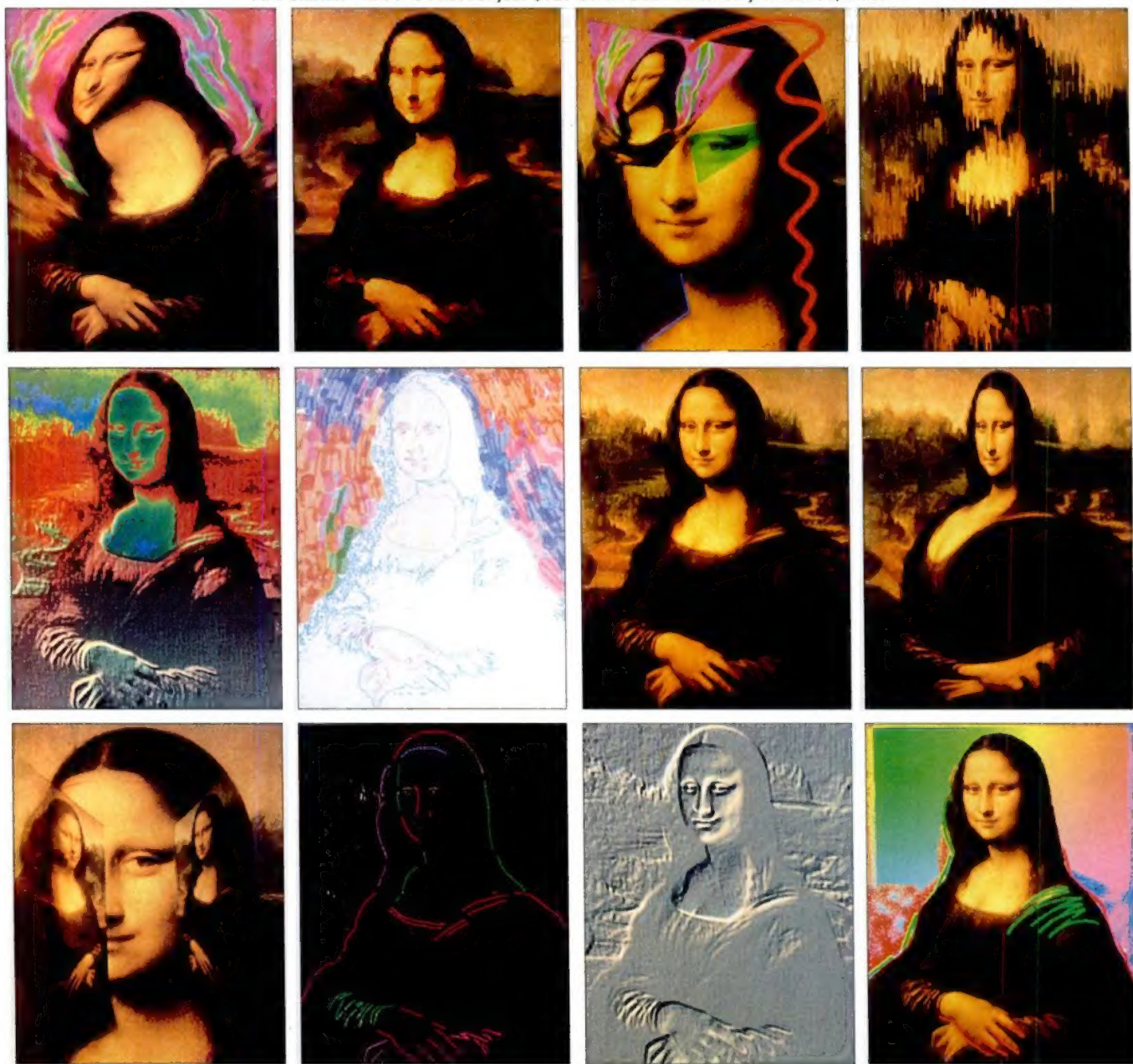


whelming. Clearly, we had struck a chord among computer users trying to sort through a proliferation of vendors and promises.

The questions we have asked are on the minds of a lot of users. How reliable is your PC? What has been your experience trying to get your computer fixed, and how good has tech support been? Would you buy another machine from this vendor?

Once again we have zeroed in

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Borland C++ beats Microsoft C 7.0 in every comparison

REPORT CARD			INFO
AUGUST 17, 1992			WORLD
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Borland C++ & Application Frameworks version 3.1			Microsoft C/C++ version 7.0
Performance			
Programming environment	Excellent	Good	
Language	Very good	Good	
Productivity	Excellent	Good	
Documentation	Very good	Excellent	
Ease of learning	Very good	Good	
Ease of use	Excellent	Good	
Support			
Support policies	Excellent	Very good	
Technical support	Very good	Very good	
Value	Excellent	Very good	
Final scores	8.9	6.9	

The decision is unanimous!

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Mix-and-Match Featureware

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Fast and Efficient

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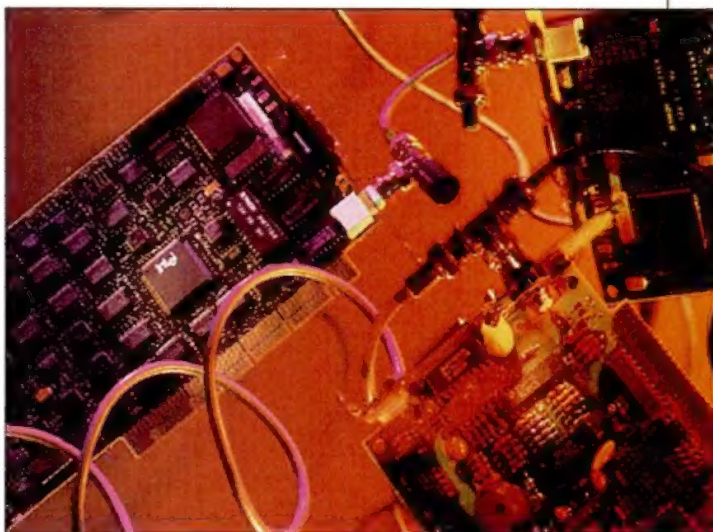
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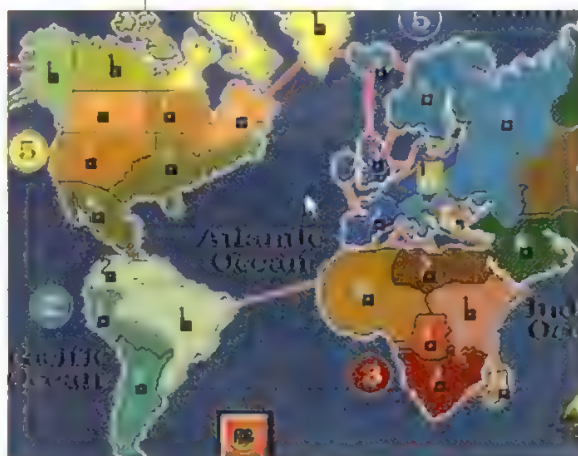
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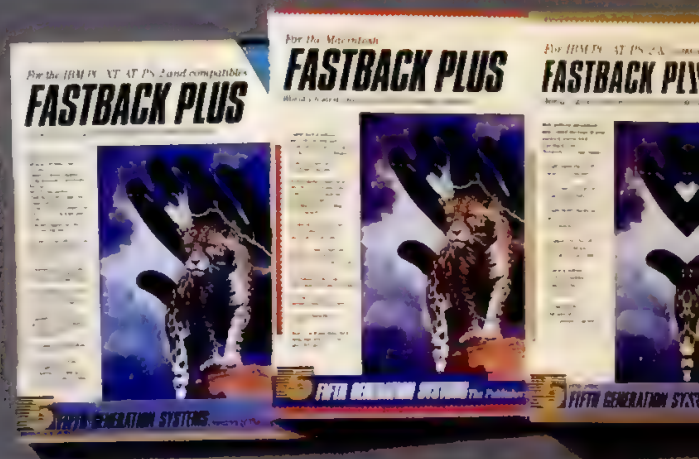


Do you feel lucky? Take a gamble on Centron Software's Casino Master for Windows (page 514).



Risk: one of three classic board games that has found a home on the PC (page 516).

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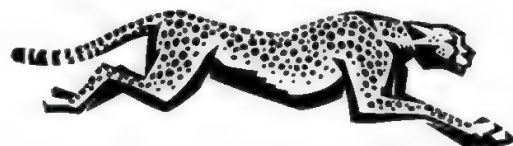
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PC Magazine Reviews

Except where noted: All *PC Magazine* reviews are of currently available products. Benchmark and performance tests are run on Compaq Deskpro 386/25s and 25e's.

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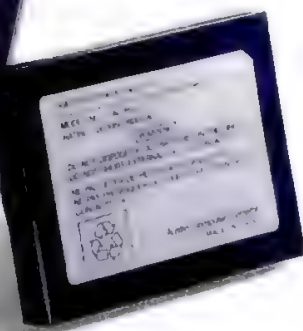
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S/R Fax Modem (9600B Fax/2400B Data)	Yes	No
Battery Life	4 Hours	3.5 Hours
Tech Support	24 Hours/Day	14 Hours/Day
Money-Back Guarantee	60 Days	30 Days
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Microsoft Windows 3.1	Yes	No
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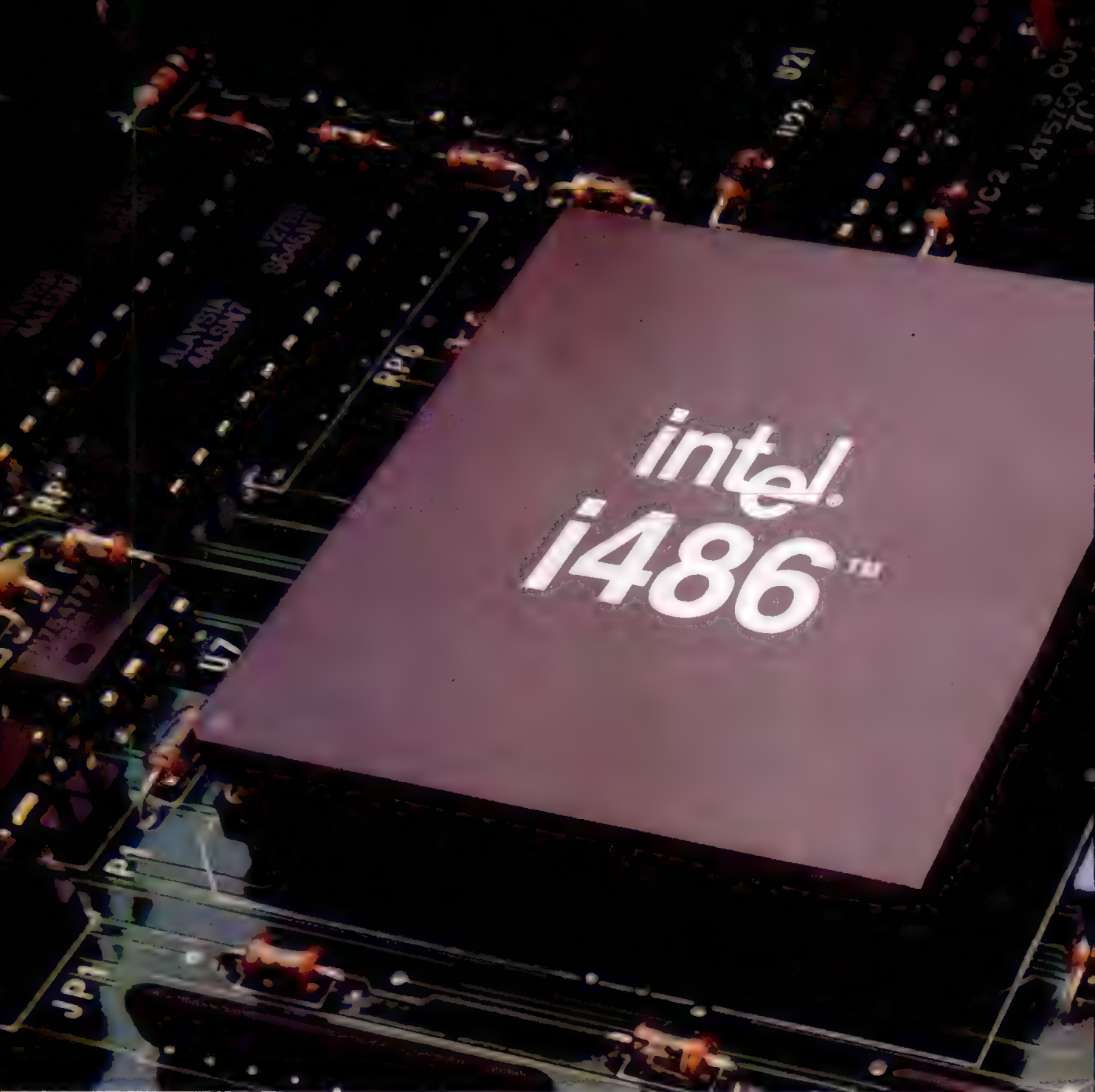
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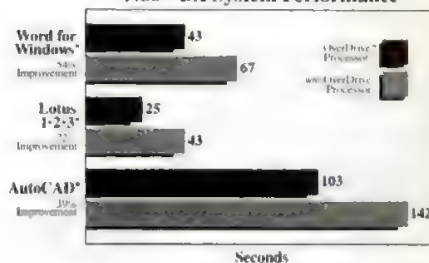
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CIRCLE 363 ON READER SERVICE CARD

According to Mr. Magoo, there's no trick to spotting a reliable monitor. You just pick one from a manufacturer that has met the stringent ISO 9000 series of standards for quality. And displays the ISO 9000 seal. The way Samtron does.

In fact, Samtron was awarded ISO's highest rating: ISO 9001. One of the very few monitor manufacturers in the world to ever earn it.

To achieve that rating, we underwent 1½ grueling years of auditing ordered by the Geneva-based International Organization for Standards (ISO). Everything we do was scrutinized. From design and manufacturing through packing and shipping.

Their high rating means that, with the possible exception of advertising, they approve of what Samtron does. The way we train our people. The way we keep our records. Our management. Our delivery. Our overall product quality. About the only thing they weren't quite sure of was Magoo.

Gads, Two New Flat-Screen Monitors.

With our world-class ISO credentials clutched in hand, we present our new high resolution flat-screen, color monitors. The SC-528DX multi-mode 15" And the SC-726V, our 17" with 0.26 dot pitch. These monitors have pictures so big and so sharp that even Mr. Magoo's eyes can see them. All the way out to the corners. Without distortion. Which makes them ideal for viewing Windows™ or CAD/CAM. If your needs are smaller look at our

14" EagleEye™ color monitor SC-428TX. With 0.28 dot pitch and 1024 x 768 non-interlaced resolution.

They're all monitors worth looking into.

Even Mr. Magoo can see that.

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CIRCLE 296 ON READER SERVICE CARD

Letters

THORNS AMID THE ROWS...

In "The New Spreadsheets: Diversity Blossoms amid The Rows and Columns" (November 10, 1992) you say that Quattro Pro for DOS now includes an optimizer that is a version of Frontline Systems' What-If Analyst add-in for Lotus 1-2-3. You then go on to say that a nearly identical optimizer is bundled with Microsoft Excel.

Although we did supply the technology for the solvers in both Excel and Quattro Pro, none of these solvers is a version of What-If Analyst.

What-If Analyst is a simple goalseeking add-in for 1-2-3 and can not perform optimization.

*Daniel H. Fylstra
President, Frontline Systems
Incline Village, Nevada*

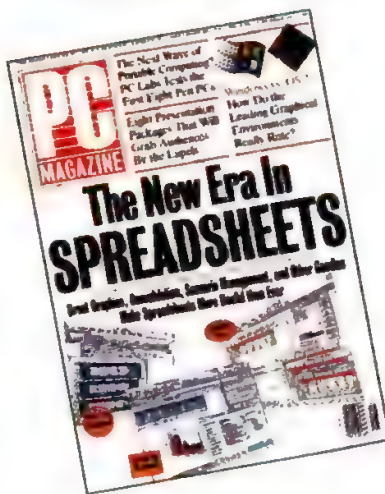
I would like to clarify a few errors that I believe blemished your review of the Lucid 3-D spreadsheet.

Lucid 3-D outperformed the other products reviewed in five out of nine benchmark tests, making it the fastest spreadsheet overall, but no mention of those results were found in the text of the review.

In addition, Lucid was completely left out of two important tests: financial and mathematical recalculations. Lucid would have done well in these tests because it recalculates the screen as you move around the spreadsheet, making recalculations almost instantaneous. By excluding Lucid from these tests, you mislead your readers by leaving them with the impression that Lucid is limited in its recalculation capability.

*J. Mark Lambright
President, Lucid Corp.
Dallas, Texas*

• Since Lucid 3-D only recalculates the portion of the spreadsheet that is on the screen, the financial and mathematical recalculation test results could not be compared to other products that do recalculate the entire spreadsheet. It is possible to set up the test to force a recalculation, but not in a way that would reflect real world performance.—Ed



*Let's get a few
things straight about
spreadsheets.*

WHAT ABOUT VENTURA?

I was surprised that in your discussion of desktop publishing you said that "there just isn't anything on the market that can do all we want" ("Inside" November 10, 1992). You cite as your problems version control, the inability of editorial staff to edit layouts, and the need to separate text files from layout files.

Having worked for two years at a medium-circulation magazine, I know that Ventura Publisher can address these problems much better than Aldus Corporation's product, PageMaker.

Our editors were able to ride roughshod over the layouts, editing copy to fit, mainly because Ventura is capable of logically separating editing tasks from layout tasks. In addition we found Ventura's "project file", a feature which stores text in its original format, separate from the layouts, extremely convenient. This lets us to do all of our copy editing in any word processor before having to edit to fit in Ventura.

Unfortunately, many organizations resist Ventura because it requires a highly skilled individual to set up the layouts. Once set up, however, these layouts are rock-solid.

*John Meyer
San Francisco, California*

THE PEN IS MIGHTIER THAN YOU THINK!

In John C. Dvorak's "The Shallow Promise of Pens" (November 24, 1992), he says that "An insurance agent is the only candidate" for this technology. Statements like this show how narrow-minded Mr. Dvorak can be in his writing.

Working for a paramedic service, my colleagues and I have begun using a pen-based system to enable us to speed up data collection and processing in the field. Pen-based data entry greatly reduces the time paramedics need to spend at a desktop computer struggling with the hunt-and-peck method of typing.

Thanks to this technology, paramedics can get back on the street where they're needed the most.

*Eric Kuzmack
Kensington, Maryland*

John C. Dvorak's scathing attack on pen-based computer technology, "The Shallow Promise of Pens" (November 24, 1992), demonstrates that even those with great reputations can be embarrassingly myopic. Dvorak sounds like an adolescent trying to save face by ridiculing a popular sport because he neglected to take part in it earlier on. Even current pen technology is too powerful to simply ignore.

There is no use bantering about it; the real judges will be the millions of people who will be using pen computers within a few years.

*Andrew Steckley
Waterloo, Canada*

EASY ON THE MEMORY

I was prompted to write after reading the wrong advice given to your readers regarding fonts and font solutions.

Contrary to "Fonts for a DeskJet" ("Advisor" Nov. 10, 1992), users do not need to increase the amount of RAM in the HP DeskJet to utilize font solutions such as True Type, ATM, or other similar packages.

Traditionally, soft fonts are downloaded to the printer either ahead of time or at print time. These font packages, however, do not operate this way when driving a DeskJet. They assemble the

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LETTERS

graphic image of the page to be printed in the computer, then send that image to the printer.

Furthermore, the DeskJet receives its graphics info a scanline at a time as opposed to a laser printer, which builds an entire page inside the printer itself before any printing begins (when printing under Windows). This means that regardless of the complexity of the output, the DeskJet can print it without needing any additional memory.

Jim Hinsch
West New York, New Jersey

):(<g>

Commentaries on the dangers of e-mail, such as Bill Machrone's "Electronic Mail: Threat or Menace?" (November 10, 1992), amuse me. E-mail is, after all, nothing more than written communication with a relatively new transportation mechanism. People have been exchanging written communications (that is, letters) for thousands of years, but only with e-mail have we begun to worry about the lack of "body language and tone of voice that convey so much in face-to-face meetings." Now, we are afraid to crack a joke in e-mail without one of those silly emoticons as a warning.

David Datz
Altadena, California

A UTILITY FOR YOUR CD

Jeff Prosis's CDPLAYER for Windows ("Utilities", November 24, 1992) is just the ticket, and getting it up and running was a snap. His creation is far superior to the DOS utility I was using. That program's biggest drawback was that it tied up my system in DOS and wouldn't play continuously under Windows.

Now, I can start Prosis's CDPLAYER in Windows and then exit to run DOS programs. The CD keeps on playing and the DOS programs seem to run fine with the CD playing in the background.

I want to thank Prosis for giving this to us. I almost feel guilty that I didn't have to pay him for it.

Jeff Greene
San Jose, CA

HE'S BACK!

Thanks for bringing Charles Petzold back into the fold. His "Environments" column is what I used to read first. Then he started writing a few columns on Windows programming and his column dropped into my "really should read" category. With his columns on MIDI support in multimedia Windows, he dropped to "look at the title."

Now he's back! Writing about GPI and OS/2 2.0 PM. Today it's fonts, but

*I find it ridiculous that
there are companies selling
portable PCs that have only
110-volt power packs.
Even my electric
toothbrush has a voltage-
sensing power pack.*

hopefully in future Environments columns Petzold will touch on WPS programming, SOM, and REXX. Please teach me, Charles, I eagerly await your next lesson!

Joseph C. Krupp
Springfield, Virginia

UNFRIENDLY AMI

Maybe I missed it in your review of Ami Pro 3.0 ("First Looks," September 15, 1992), but for all its wonder, the program is still significantly flawed in one elementary respect: its lack of filenaming options.

Incredibly, a user has no choice when saving a file to the Ami Pro format but to accept the file extension ".SAM." Most word processors today either don't care what a user calls a file, or they merely suggest an extension that can easily be overridden.

Lotus technical support says that there is no way around the ".SAM" extension. I'm told that ".SAM" is a hold-over from the days when Samna owned and distributed Ami Pro, but I hope that Lotus soon changes this.

Peter O.E. Bekker, Jr.
New York, New York

ONLY PORTABLE IN THE USA

I travel internationally and find it ridiculous that there are computer companies selling portable PCs that have only 110-volt power packs. Although some of these companies may offer 220-volt power packs, they are only for 220 volts, forcing you to carry around two power packs. What happened to portability? Even my electric toothbrush has a voltage-sensing power pack.

Robert Otto
Broken Arrow, Oklahoma

HACKERS HELP MICROSOFT

What do you mean, "Windows" overwhelming software superiority will wane in time, of course, as additional OS/2 applications become available..." ("Will The New Standard Please Stand Up?" November 10, 1992)? Microsoft has recently courted the Association of Shareware Professionals in the hope of getting shareware authors and hackers to write for Windows NT. IBM, meanwhile, has done nothing of the sort.

Microsoft has accepted the role small utilities play in creating a stable user base for any given operating system. IBM, however, doesn't wish to openly embrace this fact yet. Too bad for IBM. In the ongoing battle between OS/2 and Windows, this gives Microsoft a major tactical advantage.

Rob Rosenberger
O'Fallon, Illinois

CORRECTIONS AND AMPLIFICATIONS

The warranty for the Kyocera Ecosys a-Si Printer FS-1500A ("Mainstream Lasers: Getting Better All The Time," November 24, 1992) is one year for parts and labor for the printer and three years on the LED array and drum.

HOW TO WRITE TO PC MAGAZINE

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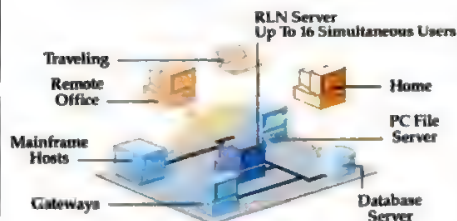
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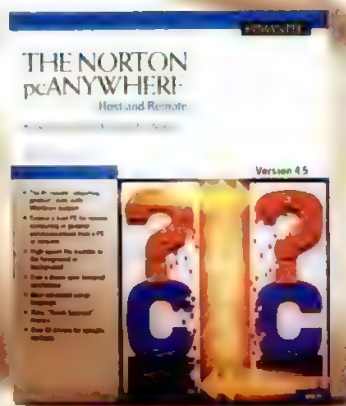
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Computer Orders Delayed

Compaq and IBM report record orders.

A year ago it seemed improbable that demand for PCs from Compaq and IBM could outstrip supply, as both vendors were losing market share to lower-priced competitors. But both companies have dramatically revamped their strategies in the past year and intro-

duced "value-line systems" priced more in keeping with their competition. Well, they must be doing something right; at least, that's one way of looking at the four- to six-week backlog of large PC orders IBM and Compaq are struggling to overcome.

Resellers say they see signs that IBM and Compaq are narrowing the backlog, but they often disagree on who's closing the gap fastest. Rye Brook, New York-based JWP, which is experiencing backlogs from both Compaq and IBM that are three times as high as ever before, reports that Compaq's supply to the dealership is increasing, while IBM's is still experiencing record delays. Meanwhile, CompuCom Systems of Dallas, Texas, sees IBM improving while Compaq lags behind expectations.

The Compaq systems in highest demand are the high-end Deskpro 50M, 4/331, and 4/661, but backlogs exist across the board. The ProLinea 4/33 is also in high demand, but Compaq reports that it is manufacturing two ProLinea units every minute to stem the tide

of orders. Production of the LTE Lite/25 portable, however, has never caught up with demand, and neither Compaq nor resellers are optimistic that it will any time soon.

The IBM PS/2 Model 77 and the new ThinkPad 700 portables are the hot items for Big Blue. CompuCom expects that the ThinkPad 700C could clear its backlog by

the beginning of 1993. IBM says the PS/2 systems should be widely available early in the first quarter. The low-priced, consumer-oriented PS/1 and ValuePoint systems are shipping on time, according to the company.

The inability to meet demand is a problem confined mostly to Compaq and IBM. Dealers of AST Research and Hewlett-Packard systems report

some delays but expect to clear up the problems by the time you read this. Direct-mail vendors Dell and Gateway 2000 claim they are currently having no trouble meeting demand. The only acknowledged exception is Dell's 320SLi subnotebook, for which there was a four-week delay in early December.

Continues on page 32

Holographic Storage

HOLOGRAMS MAY ONE DAY COMPETE with CD-ROMs as a storage medium for masses of data. A new holographic storage technology was recently developed by a research consortium based in Austin, Texas. Tamarack Storage Devices, the spin-off company, expects to have drives available by the end of 1994.

Using a laser to store the data on media resembling a 35-mm slide, a random-access tape pack (*ratpack* for short) will hold about a gigabyte of data—about double the capacity of a CD-ROM disk. Although the ratpacks are more akin to WORM (write once, read many) drives than hard disks, data access will be about ten times as fast as hard disks, and hundreds of times as fast as CD-ROMs.

High densities are possible because the data is stored as a three-dimensional hologram. Data is stacked in two-dimensional pages, with up to 50 pages in one 3-D volume. Tamarack is also working on an even higher-density storage medium that will store the pages in a crystallite material.

The ratpack drive will be about the size of today's 5.25-inch drives. It will have removable media and will be priced comparably to high-end tape storage devices. With their vast storage capability and fast access times and data transfer rates, Tamarack's drives will be ideal for multimedia files that contain video, sound, and text.

—Christopher Barr

OLE 2.0 Coming

Creating compound documents under Windows with, say, a spreadsheet, a chart, and a sound clip embedded in a word processor document has been no picnic. The current version of Microsoft's OLE (Object Linking and Embedding), which was designed to make compound documents easier, is difficult to use, and the results are often disastrous because of the memory requirements, incompatibilities between applications, and user error.

Version 2.0 of OLE, now available in



With its Vertical Integrated Manufacturing Systems, Compaq cranks out two ProLineas a minute.

Pipeline By Robin Raskin

Unix Comes Around Again

With its multitasking, ultrasecure, and well-connected personality, Unix has all the right stuff to be a successful operating system. Before OS/2 2.0 and Windows NT were even pipe dreams, Unix was a 32-bit environment. So why has Unix failed to make any marked impression on the mainstream desktop?

Let me count the reasons. There's some truth to the general lore that while Unix is a great operating system, the Unix folks can't market their way out of a paper bag, but that's really the superficial answer. Much of the problem is historical: When Unix first came out, its hardware requirements were astronomical—and unheard of in the PC environment. The intersection of people who needed Unix and those who needed desktop machines was a null set.

Then there's the little matter of Intel. For the most part, Unix operating systems, at least those with any sort of graphical user interface, did not run on Intel platforms. The various flavors of Unix were command-line-driven operating systems that only nerds could love. Born in academia, Unix has never bred enough mainstream business applications to lure desktop users. Businesses that really needed multitasking bought Unix from Locus or SCO; a few VARs got rich, but the majority of the desktop world remained DOS-based.

Every couple of years, however, Unix resurfaces as a real can-

didate for dominant operating system on the desktop. This time its reappearance has more oomph than usual.

USL, a subsidiary of AT&T, has delivered *Destiny*, a binary-ready version of Unix System V Release 4.2. Instead of shipping as uncompiled source code in traditional Unix fashion, *Destiny* is delivered as a plug-and-play operating system. USL and Novell have formed a joint venture, *Univel*, which is marketing an enticing version of System V 4.2 with NetWare components built in, called *UnixWare*.

Not quite finished is Sun's *Solaris*, which relies on Release 4.0 of System V. Sun has been diligently plugging away at this Intel-based version of its system, but at this writing, *Solaris*'s DOS compatibility box was still not operable.

SCO, the most stable and well-known of the Intel Unix flavors, was first on the platform. First came SCO's character-based *Xenix*; the most recent GUI version, *Open Desktop*, relies on SCO's Unix System V Release 3.2. This version lags behind the new competition, but SCO has enhanced Release 3.2 to contain Release 4.0 features.

The underdog among the many contenders for Intel hearts is *NeXTStep 486*, a version of *NeXT*'s Unix that runs on Intel architectures. It's the only one of the bunch that relies on the Mach 3 kernel instead of the AT&T kernel.

All are handsome, powerhouse operating systems, but all still require hefty hardware. And even though they'll run DOS and Windows apps, they have few native applications. Because they are modular to an extreme, with a variety of windows managers and desktop managers to choose from, cobbling together one of these systems can be trying. Now that the hardware gap has narrowed, are we finally ready for Unix?

Robin Raskin is an executive editor of PC Magazine.



PHOTOGRAPH BY PETER BREGGORE

beta test to software developers and expected in some applications later in 1993, promises to be very different. OLE, which works through a series of DLLs (dynamic link libraries), defines how applications use data as objects. The objects may be drawings, sound files, charts or graphs, spreadsheets, video or animated clips, or text. When you install an application, it registers its objects in a database to let other applications know which resources it can make available.

OLE 2.0 will have a number of new features that will make it easier to use, one of the most striking being *in situ* (also known as in-context) editing, which means that you'll be able to work on an embedded file without having to switch to another window. For example, if you embed a CorelDRAW illustration in a Microsoft Word for Windows document and you want to revise the drawing, you'll simply double-click on the drawing, and the tools around the edge of the screen will change from Word for Windows tools to CorelDRAW tools. This is a big improvement from OLE 1.0, which would launch CorelDRAW in another window.

Changes have been made to OLE's infrastructure to facilitate the handling of ob-

jects. You'll be able to drag and drop objects from one application to another and nest one object within another. Version 2.0 will require less memory for some tasks because of a new object model that lets applications load into memory only the portions of a file it needs, leaving the remainder stored on-disk.

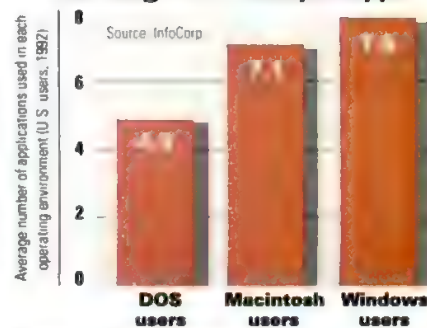
The list of companies committed to supporting OLE 2.0 is impressive. It includes Aldus, Central Point Software, Computer Associates, Corel, Frame Technologies, Image-In, Lotus, Micrografix, and WordPerfect. But despite the show of support and a software development kit available in beta test, most companies wouldn't commit to a timetable for implementing the technology. Microsoft, however, was confident that the next major revisions of Word for Windows and Excel (both due in the second half of 1993) will support

OLE 2.0, once again raising questions about whether or not the company's applications developers have an inside advantage when it comes to systems technology (Trends, December 8, 1992). Developers who do put OLE 2.0 in applications in 1993 (perhaps Microsoft alone) will implement it as a DLL.

Although OLE 2.0 will benefit today's applications, more than anything else, OLE 2.0 plants the seeds for Microsoft's object-oriented future with its forthcoming operating system, code-named *Cairo* (Trends, April 28, 1992). Not expected until 1995, *Cairo* will have object-oriented everything. OLE 2.0 simply begins the education process for developers. In the meantime, Microsoft will put components of OLE 2.0 into Windows NT, due later in 1993.

—Christopher Barr

Working with Multiple Apps



Building compound documents will be especially important to Windows users, who work with more applications than Macintosh or DOS users.

Ethernet Revs Up

IF YOU THOUGHT A SUPERFAST network had to be superexpensive, think again. Despite the decade-long hype, it turns out that the Fiber Distributed Data Interface (FDDI) isn't the only way to get to 100 megabits per second. The Ethernet standards committee is pledging to bring good old 10Mb-per-second Ethernet up to speed. Even with the tenfold performance boost, the committee expects to keep the cost down to no more than twice the cost of a 10BaseT connection today (roughly \$400 for an adapter and hub port), according to Pat Thaler, the chairperson of the committee. Even CDDI, the copper version of FDDI, can run several thousand dollars a hub.

Two companies, Grand Junction and Hewlett-Packard, have made separate proposals to the Ethernet workgroup (and others are expected to make additional proposals). Both companies hope to keep the current Ethernet message format, which will make it fairly simple to mix 10-Mbps and 100-Mbps Ethernet networks. And both are aiming at high-bandwidth applications, such as multimedia.

Where they differ is in access to the Ethernet network and in the types of cable they will support. Currently, when stations are connected by Ethernet over unshielded twisted-pair, they are linked with Type 3 cable. Stations access the network when nobody is transmitting data. If two or more stations transmit data at the same time, a *collision* occurs, and both wait a random period of time before attempting to retransmit.

The first proposal, led by Grand Junction (a startup in Union City, California), recommends keeping collision detection as well as the same encoding scheme used in CDDI. But it runs the Ethernet signal over Type 5 cable, a better-quality cable. Under the Grand Junction proposal, many long-time users of 10BaseT will have to install new cabling. (Many newer sites are installing Type 5 cabling anyway.)

The Hewlett-Packard proposal calls for sticking with Type 3 cabling, although it will take up all four pairs for transmitting and receiving data (standard 10BaseT networks

use only two of the pairs). The radical part of the HP proposal is a new access method, called Demand Priority, which requires a special concentrator module to be installed in the wiring hub that connects clients together. The module relegates access to the network, not the stations. A station sends a request to the module asking for permission to transmit data and for a specific level of priority. The module grants permission to transmit data and directs the incoming data to the appropriate destination. If multiple transmissions occur at once, the higher-priority requests are serviced first.

The Demand Protocol can supply guaranteed bandwidth and priority of service, two attributes critical for multimedia networking. Guaranteed bandwidth is also important for scalability. Under the current 10-Mbps standard,

the performance of Ethernet networks declines dramatically as more users are added. Here, the performance of the network is bounded by the speed of the hub. If the hub is able to process enough requests simultaneously, adding users should have little effect. Aside from any technical limitations of the HP proposal, the standards committee will have to overcome resistance to this radical departure from the current Ethernet standard.

Whichever proposal the committee adopts, it's clear that fast, inexpensive networks are on the way.

—David Greenfield

Hardware Comes To Virus Protection

MOST ANTIVIRUS PRODUCTS ARE software programs that get to work only after you boot up your system. But now vendors have begun to provide multilayered defenses with hardware that guards against virus threats.

Western Digital has just released the first generation of its Immunizer systems logic chips, designed to provide an expansive platform for software-based virus protection to build on. Western Digital's approach to the virus problem relies on a silicon-based

solution that intercepts write requests to the hard disk. The company's WD7855 system logic controller comes in low-voltage 160-pin packages and creatively co-ops the System Management Interrupts (SMI) power-management feature built into the latest 386SX, 386DX, and 486 processors from AMD, Cyrix, IBM, and Intel.

The single-chip ISA controller is built with generic antivirus technology that write-protects critical disk areas and executable files. Meanwhile, it monitors all write requests for viruslike activity. In action, the 7855 passes write requests to the IDE controller. SMI, which has monitoring hooks into all power-draining components, triggers the Immunizer, which checks if the request is direct to a protected area on the hard disk. A simple alert prompts you for accepting the write request or rebooting.

Top Retail Software

Current ranking	Last issue	Product/company
1	—	Microsoft Money for Windows 2.0 Microsoft Corp.
2	6	Stacker 3.0 Stac Electronics
3	3	WordPerfect 5.1 for Windows WordPerfect Corp.
4	2	Quicken for Windows 2.0 Intuit
5	10	QEMM-386 6.0 Quarterdeck Office Systems
6	15	Procomm Plus for Windows Datastorm Technologies
7	7	TurboTax ChipSoft Inc.
8	1	Quicken 6.0 Intuit
9	13	Microsoft Windows for Workgroups 3.1 Microsoft Corp.
10	8	Microsoft DOS 5.0 Upgrade Kit Microsoft Corp.
11	—	Microsoft Access Microsoft Corp.
12	5	Microsoft Windows 3.1 Upgrade Microsoft Corp.
13	9	Office for Windows 3.0 Microsoft Corp.
14	12	Procomm Plus 2.0 Datastorm Technologies
15	—	PC Anywhere 4.5 Symantec

The list ranks PC business programs according to the total number of copies shipped to stores and resellers in the week ending December 5, 1992. The list is based on shipments to more than 12,000 retail locations. It does not include sales made directly by software publishers and cannot be interpreted as a picture of the entire software market. Sales information compiled by Ingram-Micro.

New BIOS chip solutions offer primary-boot virus protection. The first is AMI's Hi-Flex BIOS, which monitors the boot sector and restricts write-access attempts with an alert to the user.

Ergo Computing is also taking the BIOS approach with upcoming proprietary ROM-based solutions for its machines. Ergo calls the antivirus BIOS protection Absolute Control of the Environment and Restoration Technology (ACERT). It uses encrypted CRC scanning and includes Seat Belt, which allows restoration of the critical boot record, system files, and partition tables prior to system bootup.

Digital Enterprises integrates antivirus software in a hardware-based package. Its new \$795 V-Card uses an Instant Access Flash ROM module that holds up to 32MB of memory and is rated to maintain its contents for up to ten years. Hardware and software work together on a flash EEPROM-populated 16-bit add-in card to capture and keep secure 1,280K snapshots of all executable files.

Look for more implementations of anti-virus protection on silicon and solid-state media. It's one of the sure ways to build a true multilayered antivirus defense that traps virus activity before it has a chance to damage your system.

—Greg Pastrick

Registration Drives

BY MOST ESTIMATES, ONLY ABOUT one in four users takes the time to fill out and mail in a product registration card, so vendors are experimenting with ways to get the remaining 75 percent to send their cards in, offering upgrade savings, on-line registration, and out-right bribes.

The benefits to software developers are obvious: They can find out who's buying their products, they can get valuable feedback on how the packages are being used, and they can notify customers of new products and upgrades. And, like catalog companies, they can sell their mailing lists to other vendors in high-tech industries.

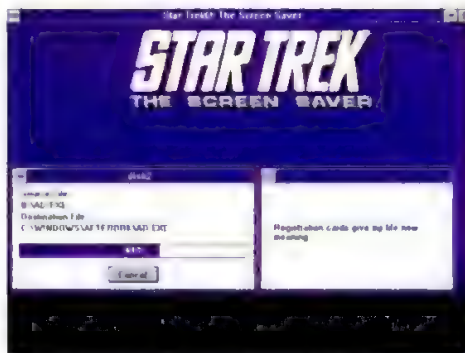
Most users don't seem interested in sending the cards in, so software companies have begun to resort to payoffs. The most popular offer is a free product; either an add-in to the purchased software or some

package that complements it. Microsoft tries both approaches, offering 25 cartoon clip-art images to everyone who registers Microsoft Publisher, and a copy of Delrina Technology's WinFax UltraLite with Works for Windows. Lotus will send 24 professionally designed templates called SmartMasters to users of Freelance 2.0 for presentation graphics. Micrografx offers 50 free photographs to Photo-

Magic customers, but only if they send in the cards.

Autodesk takes the incentive approach a step further, giving registered users a chance to win up to \$10,000 in an upcoming lottery.

Other companies have made it easier for customers



Registration cards means more to some.

to register by phone or fax. Autodesk Retail Products allows both. QuarkXPress for Windows users can register with Quark through a modem during installation, and International Microcomputer Systems, maker of TurboCAD drafting software, lets customers register through a CompuServe bulletin board.—Andrew Kantor

Briefs

THE LATEST SOFTWARE SALES NUMBERS

show the continuing growth of the Windows market, according to figures released by the Software Publishers Association. DOS application sales were down 16 percent in the third quarter compared to the same period in 1991, with a total of \$644 million in sales.

Though total Windows application sales revenue in the third quarter was smaller than DOS sales revenue at \$487 million, that figure represents a 91 percent increase over the same period in 1991. In both the word processing and spreadsheet categories, Windows apps are now clearly outselling DOS apps.

INDEPENDENT PROGRAMMERS MAY FIND

it easier to get and keep copyrights to their work, now that the Second U.S. Circuit Court of Appeals has reversed the decision of a lower court in a copyright dispute.

In 1980, programmer Clifford Aymes

was hired as a freelancer by Island Swimming Sales to write a software program to track cash flow and inventory. Both he and Island Swimming later claimed ownership of the program, and the court ruled for Island Swimming.

On appeal, the court ruled that since Aymes had never been given benefits and the company hadn't paid Social Security taxes for him, his status as an independent programmer with rights to his own work was clear.

TOM BROKAW, WHAT ARE YOU DOING

here? A pilot test of NBC Desktop News, a joint venture of NBC News and IBM, is underway. The service is designed to provide executives with a menu of up-to-the-minute news reports customized to their particular interests. Click on the story you want to see and you get a full-motion video report. Delivery is via satellite, over-the-air broadcast, fiber optic, or cable.

—Mary Kathleen Flynn

PC Backlog

CONTINUED FROM PAGE 29

Although a shortage of Intel CPUs has caused backlogs in the past, both Compaq and IBM say their 486 supplies are ample. Some of the current delays are blamed on occasional shortages of disk drives and memory chips. A short supply of system boards slowed down production of the Dell 320SLi late last year, according to a Dell spokesperson.

But the biggest culprit for the delays seems to be a record number of orders. Compaq says the surge of orders for all systems has not waned since the company announced price cuts and new PC lines last year. In September, the Houston-based manufacturer shipped a record number of units. And IBM reports that orders in the fourth quarter were the highest in that company's history.

Skyrocketing demand is a problem that other PC vendors may wish they had. Certainly, as the year ended, the best-known names in the PC business were coming back as strong players in a market that once threatened to run away from them.

—Brad Grimes

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- ▶ Local Bus Video, High Performance VGA with 1MB
- ▶ 14" 1024 x 768 NI VGA Color Monitor
- ▶ 1.2MB 5.25" and 1.44MB 3.5" Floppy Drive
- ▶ Flash BIOS
- ▶ 8 Open Expansion Slots (7 ISA and 1 Local Bus)
- ▶ Small Footprint Chassis, 6 Drive Bays
- ▶ 1 Parallel and 2 Serial Ports, Integrated
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- ▶ 14" 1024 x 768 NI VGA Color Monitor
- ▶ 1.2MB 5.25" and 1.44MB 3.5" Floppy Drive
- ▶ Flash BIOS
- ▶ 8 Open Expansion Slots (7 ISA and 1 Local Bus)
- ▶ Small Footprint Chassis, 6 Drive Bays
- ▶ 1 Parallel and 2 Serial Ports, Integrated
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- ▶ High-Resolution Mouse
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CIRCLE 026 ON READER SERVICE CARD

First Looks

HANDS-ON EVALUATIONS OF THE NEWEST SHIPPING PRODUCTS

Computers

New Epson System Highlights Wingine Video Technology

BY TIN ALBANO AND
DON WILLMOTT

The race to speed up Windows video performance by any means necessary continues. The latest entrant, Chips & Technologies' 64200 Wingine chip set, has found a home in Epson's Progression, a PC that fails to win the race but implements the new chip set well. For a non-VESA local-bus system, its per-

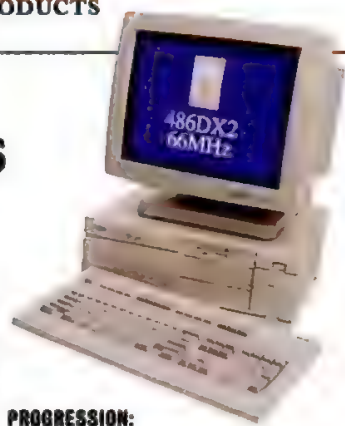
formance is excellent.

There are three Progression models: a 25-MHz 486SX system (\$2,299), a 33-MHz 486DX system (\$2,799), and a 66-MHz 486DX2 system (\$3,250). All come with 4MB RAM (expandable to 128MB), one floppy disk drive, a 240MB hard disk, DOS 5.0, Microsoft Windows 3.1, and Bitstream FaceLift.

Note that those prices don't include a monitor. A 14-inch

display is \$349, and the 17-inch Epson Professional Series display (\$1,099) we tested with the 66-MHz model brought the total machine price to \$4,349, making Progression several hundred dollars more expensive than many of the 74 66-MHz machines PC Magazine Labs tested for "DX2/66: The New Speed Limit" (January 26, 1993).

All three Progression mod-



PROGRESSION:
Introducing a new Windows acceleration technique.

els share the same specs: the 6- by 17- by 16-inch case chassis holds five drive bays (three accessible from the front), six ISA expansion slots, and a 200-watt power supply.

CAD Software

AutoSketch for Windows: A \$300 Drafting Table

BY BRYAN M. WINTER

If you're more comfortable with a sketch pad than a computer when it comes to drawing, then AutoSketch for Windows from Autodesk Retail Products is your kind of computer-aided design (CAD) program. Positioned at the low end of the market-dominating AutoCAD family of software, AutoSketch for Windows is both an affordable introduction and a low-grade platform for fledgling designers.

Although it doesn't come close to the \$3,750 AutoCAD, Release 12, or AutoCAD, Release 11, Extension for Windows in raw power, this \$299 package fills a niche in the growing CAD market. It's crafted for users who need to jot down graphic ideas and turn

them into technical designs, but don't want to spend thousands of dollars to do it.

AutoSketch is ideal for Microsoft Windows users who work with precise graphics. What a CAD program gives you that a paint program can't is the ability to create scalable vector graphics that you can accurately place and manipulate. AutoSketch is an affordable way to

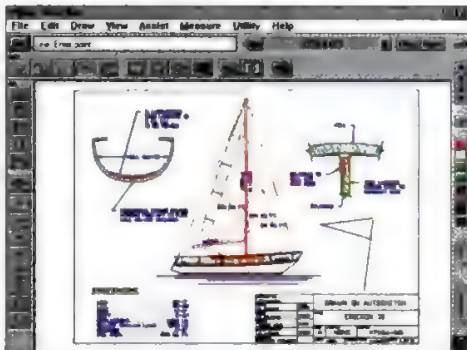
bring CAD to the desks of those who sketch only part-time, but who need to produce drawings that can be exported to AutoCAD for 3-D modeling and photorealistic rendering. It can import and export files in .BMP and .WMF formats and in Autodesk's own .DXF format.

A TECHNICAL SKETCH

AutoSketch's breezy interface makes quick work of laying out a simple idea, yet offers a variety of object snaps and grid picks that are critical for geometric construction and drafting.

The program is filled with some of the same features of AutoCAD—basic drawing primitives (lines, arcs, circles), dimensioning, text annotation, and hatching—and it uses the same entities and commands. It also offers an excellent front-end drawing selection icon that previews the available drawings and lets you select from a visual representation. This is espe-

• *Continues on page 39*



QUICK CAD: AutoSketch offers all but the most complex features of AutoCAD.

THE WINGINE WAY

The past year has seen a seemingly endless stream of new

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First Looks

Epson Progression

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Windows-acceleration technologies appear. The best ones have centered around local-bus techniques, but a lack of standardization (VESA VL-Bus, PCI, and several proprietary schemes have all been promoted) has kept the situation somewhat confusing (see "Local-Bus Technology: Video Takes a New Route," October 27, 1992).

Wingine could, in a sense, be thought of as one form of local-bus technology, though it's not related to any other particular emerging local-bus standard. The Wingine chip set puts VRAM in direct contact with the system CPU. Video runs at the processor speed without having to take a detour through the slower bus.

Video memory is accessed directly by the system CPU through the VRAM random access port while the display is continuously being refreshed via the VRAM serial port. There is no display memory bottleneck (see "How Wingine Works").

It's a linear addressing scheme similar to that of Compaq's QVision or Dell's DGX implementations, though Wingine's advantage is that it's more scalable. Upgrading the processor will result in an exponential increase in video perfor-

mance. With 2MB of VRAM, the Wingine chip set can support a maximum resolution of 1,280-by-1,024 with 8-bit color. You can get 24-bit color at a resolution of 640-by-480.

VIRTUAL CACHE

At first glance, when compared to the average overall performance of the 74 66-MHz systems PC Labs has tested, the Progression's benchmark test results may seem unremarkable. However, Epson implements two new technologies that make the Progression's performance numbers quite interesting.

The Progression's processor score, while below-average for 66-MHz 486DX2s, is nevertheless intriguing since the system is not equipped with, nor can it accept, any secondary cache. Instead, the Progression uses VirtualCache, Epson's new proprietary four-way set-associative memory access method. It

can utilize the system's entire pool of available dynamic memory as a buffer, and the net result should be cache-level performance similar to that of systems using standard direct-mapped cache architectures.

PC Labs did additional memory-performance testing to see if that was true. The findings showed that with very large models (we recalculated Microsoft Excel spreadsheets of 300K and 1.1MB), the Progression's performance did indeed approach, though not match, systems with 64K or 256K secondary caches. When tested with smaller spreadsheet models (from 50K to 300K), systems with secondary caches did have a performance advantage. There was no disk activity during these tests.

VIDEO SPEED

The highest Graphics Winmark score PC Labs has seen on a 66-

We used PC Magazine Labs' Hardware Benchmark Tests, Release 7.0, to measure the PC's processor, memory, video, and disk subsystem performance. The Graphics Winmark score is based on 12 Windows graphics and text functions derived from extensive profiling of popular Windows applications; each function is weighted to reflect how frequently it is used

Benchmark Tests: Epson Progression

The Epson Progression's Graphics Winmark score of 14.87 is the best we've seen for any non-VESA VL-Bus system; it even outperforms Compaq's celebrated QVision. Even so, many local-bus implementations on less-expensive 66-MHz systems we've tested are faster.

Higher scores represent better performance.	Processor (operations per second)	Memory (kilobytes per second)	Video (thousands of operations per second)	Disk (kilobytes per second)	Graphics Winmark (megapixels per second)
486DX2/66 average	15,354.59	6,304.61	3,784.34	47.66	8.09
Epson Progression	12,033.27	6,663.22	2,976.27	26.59	14.87

MHz system, a 42.64 turned in by the \$2,995 486-66 Zeos (using a Weitek Power 9000 chip set), was produced by a VESA VL-Bus card. The Progression, using the Wingine chip set, produced a Graphics Winmark score of 14.87, the fastest non-VESA local-bus score we have seen. It easily outpaces the 12.34 score of the \$5,192 Compaq Deskpro 66/M with its much-lauded QVision.

The Progression's score of 26.59 on our disk test may also seem rather uninspiring when compared to the results of other 66-MHz 486DX2s we've tested, but it's actually on a par with systems not outfitted with SCSI hard disks and large caching-disk controllers.

FASCINATING TECHNOLOGY

The Wingine chip set proves to be a fascinating technology whose future implementations will no doubt continue to get faster. The Epson Progression, the Wingine's first home, is priced at the high end of each of three processor classes in which it competes, and may have a rough time competing in this price-driven market despite its technological wizardry.

• List price: *Epson Progression* with 4MB RAM, 240MB hard disk, and mouse: 25-MHz 486SX, \$2,299; 33-MHz 486DX, \$2,799; 66-MHz 486DX2, \$3,250; 14-inch monitor, \$349; 17-inch monitor, \$1,099.

Epson America Inc., 20770 Madrona Ave., Torrance, CA 90509; 800-922-8911, 310-782-0770; fax, 800-922-8911.

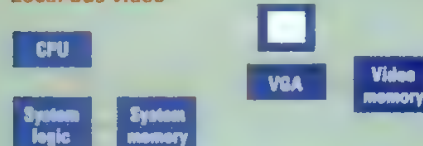
Circle 436 on reader service card

How Wingine Works

Local-bus architectures and Microsoft Windows accelerators have grabbed all the headlines, but the video controller in the Epson Progression is using a different technique to speed up Windows. Chips & Technologies' Wingine controller is essentially a 16-bit VGA chip extended to allow direct access to VRAM display memory as system memory in Windows Acceleration mode.

By turning video memory into one or more banks of linear-addressable system memory, the Wingine chip set in the Progression produced a Graphics Winmark score of 14.87. Wingine technology holds much promise and is expected to show up on many hardware platforms. Other implementations, perhaps employing additional video acceleration techniques, are likely to perform even faster. —Mary Kathleen Flynn

Local-bus video



Wingine video



ISA bus

AutoSketch

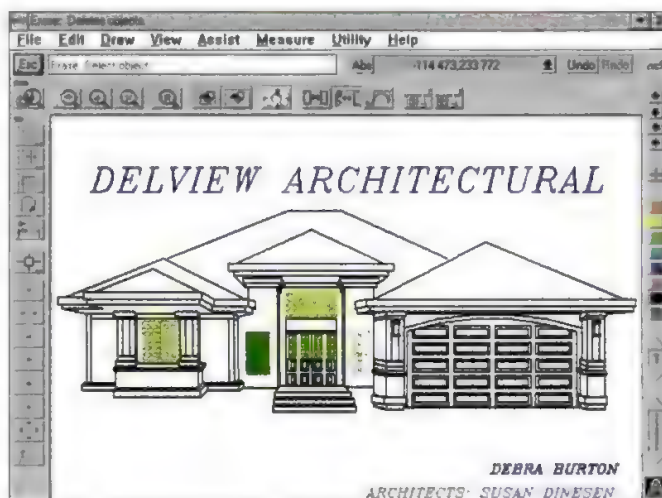
CONTINUED FROM PAGE 37

cially valuable if you work on a number of drawings at once. And with the guidance of the amazing little "smart cursor," you can quickly negotiate the screen and the learning curve.

Other important productivity tools add substantially to the value of AutoSketch. You can easily toggle line types and colors and enter commands through function-key shortcuts.

There are also several zoom and pan options for quickly scoping a drawing before focusing on a specific part. CAD users often lose focus as they zoom into their drawings, only to zoom out later and realize that they placed unnecessary detail into an unimportant area of the drawing.

AutoSketch also comes with



UPWARD: You can export files drawn in AutoSketch for Windows to higher-end programs for further work.

12MB of graphic clip-art blocks that range from LAN wiring to landscape trees.

As one of many entries in the low-end CAD/graphics market,

AutoSketch has some tough competition from DesignCAD Professional, Drafix Windows CAD, and a host of other packages. Some of them even offer

more features at a lower cost. AutoSketch is not programmable and lacks profession-specific tools, but the others don't have AutoSketch's unique advantage: As an Autodesk product, it comes with the support of an industry leader.

AutoSketch is good at all but the most complex CAD work and serves as a complement to the features in AutoCAD. With its easy Windows interface and powerful set of design tools, it may be all you need for your 2-D drafting work.

• **List price:** AutoSketch for Windows, Version 1.0, \$299. Requires: 3MB RAM, 4MB hard disk space, Windows 3.0 or 3.1. Autodesk Retail Products, 11911 North Creek Pkwy. South, Bothell, WA 98011; 800-228-3601, 206-487-2233; fax, 206-485-0021.

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■ Pen Computers

NCR Lights Up Pen Computing with New Screen

BY BRUCE BROWN

The slow-starting pen-computing market will certainly welcome the arrival of the NCR 3130 NotePad pen-based tablet. A much improved revamping of NCR Corp.'s 3125 NotePad released last year, the 3130 NotePad adds optional screen backlighting and bigger hard disks for an expected street price below \$3,500.

The 3125 was praised for its support of multiple pen operating systems, its light weight, and its good battery life, but its small 20MB hard disk and dim screen were significant drawbacks.

The new 3130 is available with either a reflective or backlit screen and a choice of 40MB or 60MB shock-mounted hard disks. It also includes data-protection circuitry with sensors that can detect rapid acceleration if the unit is dropped. The sensors will shut off the drive and restart it automatically once motion ceases.

As with the 3125, 3130 users can configure the NotePad with flash memory instead of using a hard disk. The 3130 can have up to 20MB of flash memory; the 3125 had a maximum of 12MB.

The 3130 model with the reflective screen (Model 3130R) uses the same 6:1 contrast screen as the 3125, weighs 4.4 pounds, and has an improved 4- to 5-hour battery life rating. The 3130B backlit model has a 13:1 contrast ratio display, weighs 4.7 pounds, and is rated to last 2 to 4 hours on a single battery charge. The standard AC adapter will now rapidly charge the battery while the unit is running.

The backlit screen is as easy to use in low light conditions as a conventional notebook's monochrome LCD screen. There's a brightness control on the front of the case, and a software utility

that controls the backlight intensity.

Like the 3125, both 3130 models are based on an Intel 20-MHz 386SL processor with a 16K external RAM cache. The LCD digitizer uses a cordless stylus as an input device. Because of improved digitizer circuitry in the 3130, the screen's



IMPROVED: The 3130's backlit screen makes it more usable.

responsiveness to the pen is noticeably improved. Handwriting recognition, controlled by a recognition engine integral to a pen operating system, hasn't changed.

The 3130 supports Microsoft Windows for Pen Computing, PenDOS, PenPoint, and PenRight!, the four major pen operating systems, one of which is factory installed for you.

A typical 3125 with 4MB RAM and a 20MB hard disk has a current street price of around \$3,000. The 3130 evaluation unit

we tested, with 8MB of RAM, a 60MB hard disk, and the backlit screen, lists for \$5,400 and has an expected street price of about \$3,500. At that price point, the 3125 should remain competitive with upcoming new products from other pen computer vendors such as NEC and Toshiba. It is still quite expensive to enter the world of pens, but at least now, with the 3130 NotePad, you can see what you are doing.

• **List price:** NCR 3130 NotePad, with 8MB RAM, 60MB hard disk, DOS 5.0, one pen operating system, \$5,400. NCR Corp., 1700 South Patterson Blvd., Dayton, OH 45479; 800-225-5627; 513-445-5000.

Circle 437 on reader service card

■ Applications Development

ObjectVision PRO: Quick, Robust Windows Prototypes

BY RICHARD DRAGAN

It's all too familiar: Your boss asks for a prototype of a Windows database application by next week. If you had time, you might code it in C/C++, but Borland International's ObjectVision PRO for Windows, Version 2.1, is a faster and equally powerful solution for prototyping database applications quickly. At \$495, it's a package that many developers will find irresistible.

This new bundle has an impressive array of features, including Borland's full-fledged Turbo C++ compiler, debugger, and utilities for writing Windows 3.1 applications; new built-in SQL links; faster multivendor database access; multimedia support; free runtime distribution rights; and Crystal Reports, an easy-to-use report generator.

ObjectVision has always been targeted at nonprogrammers. In our review of visual development environments (June 16, 1992), ObjectVision 2.0 received good scores for its ease of use, which centers around forms design, but it lost points as an all-around programming tool.

In this new release, ObjectVision PRO addresses the needs of programmers more directly, since writing a functional prototype is at least half the battle in the software development cycle.

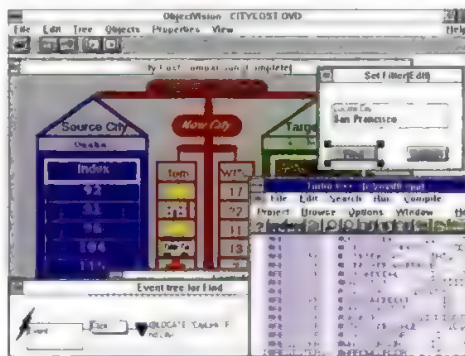
NEW TOOLS FOR PROGRAMMERS

Experienced Windows programmers know that writing dynamic link libraries (DLLs) for Windows is simpler than creating standalone Windows applications. To this end, ObjectVision PRO includes Turbo C++ Compiler with ObjectWindows, a Windows application framework. The sample code and documentation make

building your own DLLs even simpler.

With Turbo C++ for Windows, you can easily extend the already rich library of commands with customized functions, place them in DLLs, and then register them in ObjectVision PRO with the @REGISTER function. As you refine and improve your prototype, you can use add-in modules written in C/C++ to access low-

level Windows API functions. With ObjectVision PRO's SQL support (previously a \$795 add-on module), you can now link to remote databases on SQL servers, supplementing ObjectVision's ability to read native database files in several popular formats: Paradox 3.5 or 4.0, dBASE, Btrieve, and ASCII.



PROTOTYPE: A forms-based model sits atop a capable development environment.

level Windows API functions.

With ObjectVision PRO's SQL support (previously a \$795 add-on module), you can now link to remote databases on SQL servers, supplementing ObjectVision's ability to read native database files in several popular formats: Paradox 3.5 or 4.0, dBASE, Btrieve, and ASCII.

With the multimedia functions, you can place buttons in forms to trigger multimedia events. Report generation is simply a matter of designing forms with Crystal Reports without any code changes. And thanks to the free runtime version, you can distribute your completed applications royalty-free.

Programmers will also welcome a number of callback functions that allow you to add func-

tions to call the standard ObjectVision functions, and to move data to and from linked database fields. This function is particularly handy, since a customized DLL function can manipulate database files directly using ObjectVision's linking functions. This feature can be used to update more than one table at a time and to automate database transactions. You still won't get

the low-level control of Borland's Paradox Engine 3.0, for instance, but you can create functions that execute multiple database transactions behind the scenes in response to a single button-click event.

With all these add-on features, does ObjectVision PRO really tackle the needs of Windows programmers? For most, it probably does. If your application involves linking to one or more databases and fast development time is critical, then you will appreciate the instant multiuser access to databases of different formats, including SQL servers, plus the easy and capable report generator.

Although Microsoft Visual Basic 2.0 now supports SQL servers through ODBC, it doesn't support native non-SQL access to other database formats without add-on packages, and it has nothing of its own in the way of report generation.

Right out of the box, ObjectVision PRO gives you more access to more database formats more quickly. You can create a working prototype with very little programming and then op-

timize it with low-level C/C++ modules incrementally.

NONPROGRAMMING PHILOSOPHY

For prototyping and getting database applications up and running fast, ObjectVision can't be beat. But if you're a dyed-in-the-wool procedural programmer who found earlier versions of ObjectVision frustrating, you will continue to be frustrated, because ObjectVision PRO has not abandoned the original non-programming philosophy.

There is still no procedural language to speak of, and you may find it bothersome to create a DLL function for traditional procedural tasks. Also, there is no support for debugging multi-lined macro statements.

Another potential headache is the use of a global name space for all fields and control names in every form. You'll find yourself adding spaces to the names of the standard OK and Cancel push buttons if they appear frequently.

For the majority of users, however, the immediate gains in productivity outweigh the program's quirks. ObjectVision PRO is a valuable addition to any Windows developer's suite of programming tools. □

FACT FILE

ObjectVision PRO for Windows, Version 2.1

Borland International Inc.,
1800 Green Hills Rd., P.O. Box
66001, Scotts Valley, CA 95067;
800-841-8180, 408-461-9000;
fax, 800-822-4269

List price: \$495, upgrade from Version 2.0, \$199.95, upgrade from ObjectVision 2.1, \$29.95

Requires: 2MB RAM, 15MB hard disk space, Microsoft Windows 3.0 or later

In short: While designed for nonprogrammers, this new ObjectVision PRO bundle includes tools that will please programmers as well: a Turbo C/C++ compiler for Windows 3.1, new built-in SQL and multimedia support, a faster database engine, a report generator, and a royalty-free runtime version

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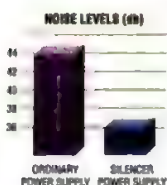
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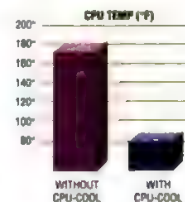
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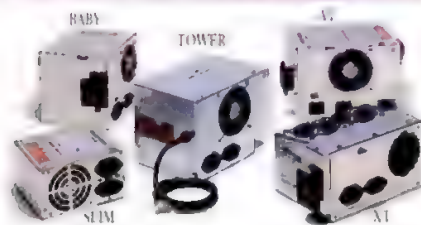


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■ LAN Hardware

Shiva LanRover/E: Up to Eight Ports for LAN Access

BY STEVE RIGNEY

The ability to call into a corporate LAN from home or hotel is becoming increasingly important, but solutions always seem to be too expensive, too costly in system resources, or simply incomplete.

Shiva Corp. has a remote access product called the LanRover/E that isn't too expensive, doesn't use a networked PC, gives excellent performance, and is very easy to install. It competes well against products such as Digital Communications Associates' Remote LAN Node ("Asynchronous Communications Servers: Dialing In at Large," October 27, 1992).

Think of the LanRover/E as a multiport RS-232 board mated to a LAN adapter. You attach modems of your choice to the serial ports, and they become available for dial-in network access with minimum hassle. The LanRover/E comes in four- and eight-port configurations for \$1,999 and \$2,999, respectively. Shiva offers a separate model for AppleTalk networks running Ethernet.

The LanRover/E lets you connect to your NetWare or AppleTalk file server as a remote node on the LAN. The calling computer must have a full complement of networking software and applications. This type of access lets you retain all of your network virtual drives and resources, but it requires careful configuration of the program and data files.

The slim 19-inch box easily mounts onto a standard rack, and Shiva includes mounting brackets. Many modem companies, including U.S. Robotics and Multi-Tech Systems, offer groups of modems that fit nicely. The LanRover/E has network connections for thin Ethernet or 10BaseT and an AUI port for a

fiber-optic or thick Ethernet transceiver. You select the media you want to use with a switch on the back, and the box has helpful LEDs for troubleshooting.

You can easily install, configure,



LAN TALK: Connect through four or eight ports.

Activity Logger.

The Shiva LanRover/E is so easy to install that it is hard to consider using anything else if you have several remote users who need constant access to your network.

• List price: *Shiva LanRover/E, 4-port model, \$1,999; 8-port, \$2,999. Shiva Corp., 1 Cambridge Center, Cambridge, MA 02142; 800-458-3550, 617-252-6500; fax, 617-252-4852.*

Circle 435 on reader service card

■ Communications Software

MicroPhone Pro Adds Multimedia, Fax Support

BY JOE SALEMI

With MicroPhone Pro, Version 1.0, multimedia meets communications. Software Ventures Corp. has updated its Microsoft Windows-based communications package MicroPhone II with features designed to work with Windows 3.1's multimedia functions. Support for sending and receiving faxes has also been added. At \$195, however, the package is a bit overpriced and is still playing catch-up with less expensive communications packages such as Procomm Plus for Windows (\$149) and QModem Pro (\$99).

MicroPhone Pro's biggest improvement over MicroPhone II is the addition of something most communication program users take for granted—a dialing

directory. MicroPhone II relied entirely on scripts to handle dialing a service and automating on-line actions. MicroPhone Pro lets you connect to a service through a script or an entry in the directory, and you can associate scripts with specific directory entries.

MicroPhone Pro takes full advantage of the Windows 3.1 interface, including support for TrueType, drag-and-drop, and Multiple Document Interface (MDI). MDI lets you start multiple sessions, so you can communicate on more than one device at the same time.

Drag-and-drop support pro-

vides some well-come conveniences. You can drop a text file onto the communications screen and send it, or, you can drop a binary file onto an icon that controls uploads for automatic file transfer.



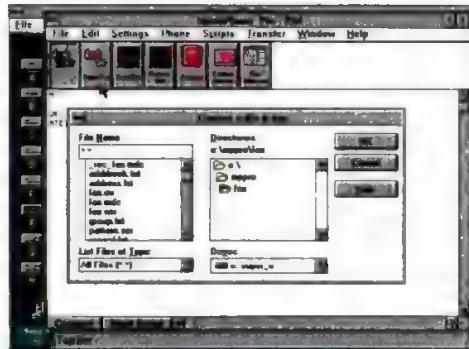
To download a demo of MicroPhone Pro from PC MagNet, type GO ZNT:DEMOS in CompuServe. From January 25 to 29, you can go on-line to discuss the program with MicroPhone product managers. Type GO ZNT:EXEC.

There's also a status bar that monitors the progress of your communication sessions and an expanded number of custom scripts for use with various on-line services and bulletin boards.

MicroPhone Pro is an incremental upgrade that's just catching up with many features other Windows communications programs already have. It's worth the upgrade price of \$49.95, but the addition of fax capabilities doesn't compensate for a price higher than those of other, more capable communications packages.

• List price: *MicroPhone Pro, Version 1.0, \$195; upgrade, \$49.95. Requires: 2MB RAM, 2.5MB hard disk space, Microsoft Windows 3.0 or later. Software Ventures Corp., 2907 Claremont Ave., Berkeley, CA 94705; 510-644-3232; fax, 510-848-0885.*

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FAXING: WinFax Lite is included.



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■ Mass Storage

Master/DC Lite: GigaTrend's New Idea in Fast Tape Backup

BY WINN L. ROSCH

Among the first of a new breed of tape backup systems using Teac's DAS/03 high-performance cassette standard, GigaTrend's Master/DC Lite crams up to 600MB onto tapes identical in size and shape (but not magnetic properties) to standard audio cassettes. The system operates at transfer rates directly competitive with QIC-525 systems that pack 525MB on quarter-inch cartridges.

But the big surprise of the Master/DC Lite package is neither its smooth, reliable ability to fit 21 tracks of data on the narrow tape nor its 243K/sec raw data rate, but rather its relatively high price. The basic system, an internally mounted 3.5-inch drive and matching ISA-based 16-bit bus-mastering SCSI host adapter, is \$2,350.

Add the 2.75- by 10.5- by 10.5-inch (HWD) metal external case and power supply (a \$500 option) and the 8-inch long BusTek 32-bit EISA-to-SCSI host adapter of the unit we tested, and you'll pay \$3,250. The special 600-foot data cassettes, currently sold only in packs of five, list for \$320 per pack (that's \$64 each).

During testing, the Master/DC Lite system was able to stream data as fast as 12.5MB per minute through the EISA bus of a Dell PowerLine 433/DE host—at least when backing up megabyte-length files. The overhead on small files and the optional automatic verification performed by the GigaTrend software slowed overall backup

performance, tripling backup times when handling thousands of short files. On the other hand, you don't have to format cassettes as you do quarter-inch minicartridges. The GigaTrend software maintains two directories (one on tape, one on disk) to speed file restoration. In testing, the "quick restore" function located and copied a single file in about 2 minutes.



BACKUP: The tapes look like audio cassettes.

As with any first-generation product, the Master/DC Lite has its weaknesses. For example, you must disassemble the external drive to set the SCSI ID and termination, you're stuck with

proprietary hardware with a single tape supplier, and the software interface appeals more to system managers than to less-skilled users.

Compared with the multi-gigabyte capacities of helical tape, with new quarter-inch cartridge standards, and with today's networked hard disks, the Master/DC Lite comes up short (though software and hardware data compression promised by midyear should double its storage). The Master/DC Lite offers good ideas and it works well, but it deserves refinement.

•List price: Master/DC Lite, internal ISA, \$2,350; external ISA, \$2,850; external MCA \$3,150; external EISA \$3,250; cassettes, five for \$320. Requires: 640K

RAM, DOS 3.3 or later or Novell's NetWare. GigaTrend Inc., 2234 Rutherford Rd., Carlsbad, CA 92008; 619-931-9122; fax, 619-931-9959.

Circle 432 on reader service card

■ Windows Utilities

Outside In 2.0: File Viewer Adds .ZIP File Support

BY BARRY SIMON

Why doesn't Microsoft Windows' File Manager have file viewers, support for .ZIP archive files, and the capacity to search within files?

Who cares? Version 2.0 of System Compatibility Corp.'s \$89 Outside In file viewer and data exchanger provides all of these missing pieces.

Outside In's primary function—viewing files—is impressive. It supports dozens of word processor formats (from WordPerfect through MASS-11 and Borland's Sprint, as well as the major databases and spreadsheets). And it now displays the correct fonts for Windows word processor file formats. Also new is support for 16 graphics file

types, most notably Micrografx Draw files, .PCX, TIFF, .TGA, .WMF, and .WPG, although support for CGM, JPEG compressed files, and Windows icon files is still missing. The new .ZIP viewer not only allows you to view the .ZIP directory, it also lets you view the contents of files.

The program can run as a standalone or it can link to Ami Pro, Microsoft Word for Windows, The Norton Desktop for Windows, WordPerfect for Windows, and several Windows e-mail programs. As a standalone, Outside In acts as a file organizer.

Although you still can't view

multiple directory trees, you can now copy, move, rename, and delete files as well as "tear off" a file view and iconize it for later perusal. You can also search for text within single or multiple files, although you can't search for multiple files inside a ZIP

It viewed the first part of complex graphic and spreadsheet files quickly and then ran as a background process. But the background handler was too polite and never grabbed any time to view the file completely.

Outside In is a superb utility that Windows users will want. Version 2.0 is a substantial upgrade, and Systems Compatibility Corp. is to be commended for offering it as a free upgrade to all its registered users.

• List price: Outside In, Version 2.0, \$89; Windows upgrade, free; upgrade from DOS versions, \$29. Requires: 2MB RAM, 2MB hard disk space, Microsoft Windows 3.0 or later. Sys-

tems Compatibility Corp., 401 N. Wabash, #600, Chicago, IL 60611; 800-333-1395, 312-329-0700; fax, 312-670-0820.

Circle 428 on reader service card



NEW VIEWERS: .GIF, .TGA, .WPG, and .ZIP formats are now supported.

archive.

We found a minor problem when we ran the program with many DOS sessions and Windows utilities in the background.



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Primavera software is being used to control the construction of the new \$30 million U.S. Embassy in La Paz.

Kuala Lumpur Tower, Malaysia

This \$100 million, 420-meter tower will be the third tallest communication tower in the world. Estimated completion date is 1996.

Melbourne Cricket Ground, Australia

The new 47,000 seat Great Southern Stand replaces the smaller original built in 1937. Finest Hour® helped schedule and coordinate the project's extensive concrete work.

Remote Sensing Satellite, Canada

RADARSAT is a low orbit satellite that will take radar images of the earth. The engineering, design and manufacturing stages for this \$300 million project are being scheduled using P3.

New Hong Kong Airport, Chek Lap Kok Island

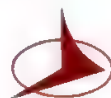
This \$20 billion airport construction project also includes the construction of highways, an airport rail system, a suspension bridge and a cable stay bridge. Projected completion is June 1997.

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■ DTP Utilities

FrameReader: The Key to the Paperless Library?

BY JAMES KARNEY

The idea of publishing electronic documents is enticing to anyone trying to maintain a large library. You eliminate printing costs and reduce distribution expenses, while providing more current (even real-time) information that can be searched with sophisticated software tools.

Frame Technology Corp.'s FrameReader for Windows brings Electronic Document Interchange (EDI) to Microsoft Windows and lets you open, read, and print on-line hypertext publications created with FrameMaker (First Looks, September 15, 1992). The product supports OLE, Multimedia Extensions, and most popular graphics formats. You can also import most standard word processing and Ventura Publisher for Windows documents into FrameMaker to be read with FrameReader.

Versions of the \$89.95 package are available on PCs and Macintoshes, and on 24 Unix platforms. The publication's source files can be located on a network or provided on floppy disks or a CD-ROM.

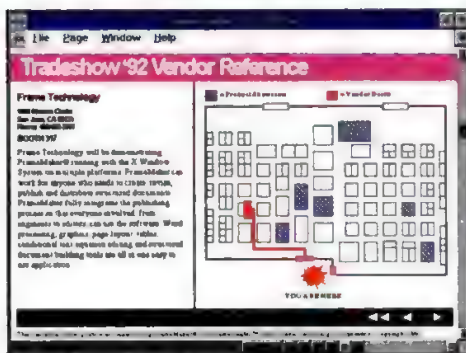
FrameReader looks and works like FrameMaker but with controls limited to navigation, viewing, and printing documents. You can open more than one publication at a time, enlarge a page up to 1,600 times to see fine detail, and move from one page to another with menu commands or by clicking on a hypertext link. And creating those links is easy.

We opened several documents of varying complexity, starting with the program's on-line manual and progressing to a 188-page ASCII technical document that we imported and modified in FrameMaker. We were able to open and navigate

without problems. There was some slowness when loading the larger files, but moving around was quick enough.

If the publication contains a typeface not available on the system you're using, a

dialog box will issue a warning. The program will automatically substitute an available font, but some formatting or special characters may be lost.



FRAMEREADER: Create hypertext documents.

■ Notebook PCs

Northgate's \$3,799 ZXPortable: Active-Matrix Color Under 6.5 Pounds

BY TIN ALBANO

Weighing under 6.5 pounds, Northgate Computer Systems' ZXPortable Active Color includes a powerful 486SX processor coupled with a fine active-matrix color screen, making the \$3,799 system a compelling competitor in the growing color notebook market.

The well-built, 2- by 11- by 8.5-inch (HWD) system comes standard with 4MB of RAM (expandable to 16MB), 8K of internal cache, a 120MB 19-millisecond Conner hard disk, and a 1.44MB floppy disk drive. It also includes one parallel port, one serial port, an external VGA port, and an external keyboard connector.

The most distinguishing feature of the ZXPortable is its 8.5-inch active-matrix color display from Sharp Electronics Corp. The screen displays 256 colors simultaneously at 640-by-480 resolution with a 60:1 contrast ratio. It provides wide viewing angles and eliminates all ghosting while running under Microsoft Win-

dows. The screen's very fast, 80-ms refresh rate prevents the mouse cursor from vanishing.

The ZXPortable performed admirably, turning in scores well above average on our benchmark tests. With the exception of the DOS Video test, the ZXPortable outperformed the \$4,350 IBM ThinkPad 700C on all DOS-based benchmark tests.



SPLASH OF COLOR: The Northgate ZXPortable.

Most notably, it produced an excellent Graphics Winmark score of 3.26 megapixels per second, on a par with the ThinkPad's 3.38. If, however, you find you're still not satisfied with the

FrameReader offers a solution for providing on-line documentation to Windows users. It may not usher in the era of the paperless library, but it does offer a way to cut costs and get information out—assuming your readers have Windows running on their PCs.

• List price: *FrameReader for Windows, Version 1.0*, \$89.95. Requires: 2MB RAM, 2MB hard disk space, Microsoft Windows 3.0 or later. Frame Technology Corp., 1010 Rincon Circle, San Jose, CA 95131; 800-843-7263, 408-433-3311; fax, 408-433-1928.

Circle 423 on reader service card

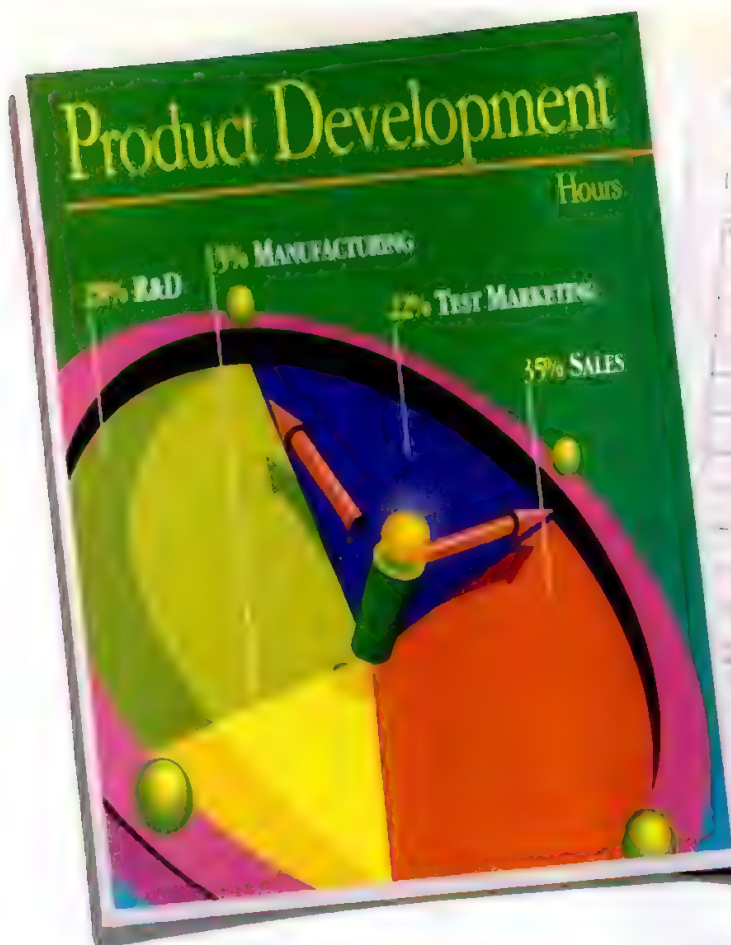
already superb performance, you can upgrade to a 25-MHz 486DX for an additional \$350.

The ZXPortable and ThinkPad also produced similar results on our Battery Rundown test. With all of the power-conservation features turned off, the ZXPortable's nickel metal hydride battery lasted 1 hour 55 minutes, compared with 1 hour 59 minutes for the ThinkPad.

Happily, you'll discover dedicated PgUp, PgDn, Home, and End keys along with the popular inverted-T cursor control layout on the keyboard. But the fact that they, along with the INS, DEL, and Enter keys are smaller than the letter keys may take some getting used to.

• List price: *Northgate ZXPortable Active Color*, with 4MB RAM, 120MB hard disk, Logitech Trackman, DOS 5.0, Microsoft Windows 3.1, carrying case, \$3,799. Northgate Computer Systems Inc., 7075 Flying Cloud Dr., Eden Prairie, MN; 800-548-1993, 612-943-8181; fax, 612-943-6965.

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CIRCLE 001 ON READER SERVICE CARD

Printers

JOLT PS: A \$6,995 Solid-Wax Solution for Color Printing

BY M. DAVID STONE

Except for Crayola, solid-wax color printing is an uncommon technology—so uncommon that when we looked at PostScript color printers in our 9th Annual Printer Issue (November 24, 1992), there was only one solid-wax printer to look at—the Tektronix Phaser III PXi.

Now, Dataproducts Corp. offers a second such printer: The \$6,695 JOLT PS, an Adobe PostScript Level 2 color printer with 39 built-in fonts.

Solid-wax printers might better be called liquid-wax printers, since they melt the wax before they print. In truth, they are similar to ink jet printers, in that they spray liquid ink onto the paper. With ink jet printers, the ink dries by evaporation. With solid wax printers it hardens by cooling.

One advantage of solid wax over liquid ink is that wax isn't absorbed by the paper, no matter how porous the paper is. That means you can print on any paper and still get saturated color and sharp edges. Indeed, the JOLT PS produced both

text and graphics output with the full color saturation and crisp, clean edges that you'd expect from this technology.

OUTPUT QUALITY

Unfortunately, the printer has output problems. Quality is nothing short of gorgeous as

lem does not show up with mixed colors, because different screen angles for the colors hide the tracks.

Another problem is the lack of a resolution-enhancement feature such as the Finepoint technology in the Phaser III PXi. This oversight results in moiré

patterns, obvious dots, and bands of colors on gray-scale and color gradient tests and in continuous tone images such as photographs. All of these things make the JOLT PS a poor choice for printing continuous tone images and gradients.

THE RIGHT FEATURES

If you don't mind these output limitations, you'll find that the printer touches most of the right bases. You'll find parallel, serial, and Apple LocalTalk connectors on the back, and the printer can accept data from all of the ports simultaneously. You'll also find a SCSI port for a third-party external hard disk. The 6MB base memory is expandable to 10MB—a \$545 option with a proprietary memory board.

Setup consists of snapping in the ink cartridges, plugging in a cable, and following the instructions for start-up clearing for the print head. The unit takes about 20 minutes to melt the wax it needs to get started.

The JOLT PS is built around a 300-dpi Dataproducts engine and controller rated at 2 pages per minute (ppm) for text and 0.3 ppm for graphics. It feeds paper the same way as the Canon SX engine in the HP LaserJet III.

Although the JOLT PS costs \$3,300 less than the Tektronix Phaser III PXi, it's not quite the bargain you might think. The JOLT PS is an A-size printer, limited to a maximum legal-size page, compared to the Phaser III PXi's 12- by 18-inch B-size capability.

According to Dataproducts, another reason for the price difference is that Dataproducts sells a separate Transparency Enhancer for creating overheads rather than including the capability in the printer, as Tektronix does. The \$300 Enhancer applies pressure and heat to flatten the wax and minimize the lensing effect from hardened drops of wax.

Keep in mind that whatever the printer's limitations are compared with the Phaser III



JOLT: Solid wax works well on many paper types.

long as the printing is limited to text, mixed colors, or small areas of primary or secondary colors. When printing a large expanse of black or of primary or secondary colors—cyan, magenta, yellow, red, green, or blue—the output shows tracks left by successive sweeps of the printhead.

With solid black areas, these tracks leave the impression of white lines because of differences in reflection. This prob-



LIVING COLORS: Expect full color saturation, problem gradients.

Our wretched species is so mad
walk on the well-trodden path
at those who are showing a new
Normal **Bold** *Italic* com



FACT FILE

JOLT PS

Dataproducts Corp., 6219 De Soto Ave., Woodland Hills, CA 91367; 800-334-3174, 818-887-8000; fax, 818-887-4789

List price: \$6,695, including one cartridge of each ink (black, cyan, yellow, magenta); additional ink cartridges complete set, \$179.95, external network connection box XT1 (supports DEC-LAT and UNIX TCPIP), \$995.

In short: Although the JOLT PS's output is disappointing compared to the much more expensive Tektronix Phaser III PXi, the solid wax printer compares favorably to thermal wax transfer printers with which it is competitively priced.

431 ON READER SERVICE CARD

PXi, a more fitting price-based comparison is to A-size thermal wax transfer printers, which have list prices of only about \$1,000 less than the JOLT PS when similarly equipped. And in comparison to those printers, the JOLT PS offers better output (except when printing large expanses of black or primary and secondary colors) and lets you print on standard paper. So while the JOLT PS may be flawed, it still outclasses other color PostScript printers in its own price range. □

Check It Out!

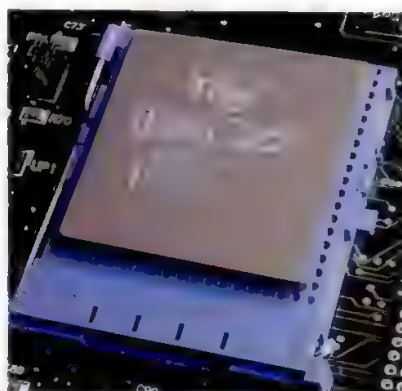
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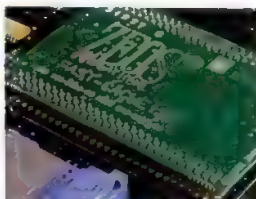
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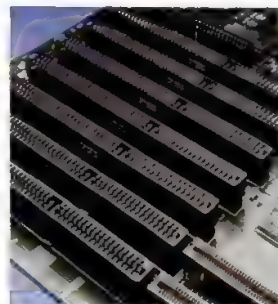


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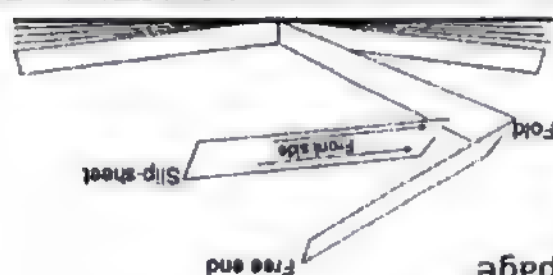
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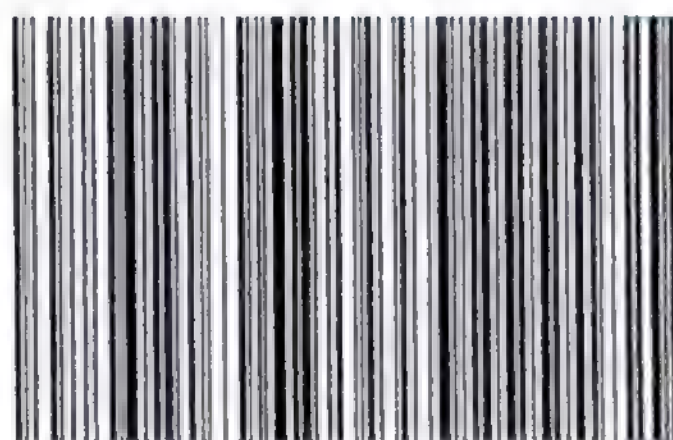
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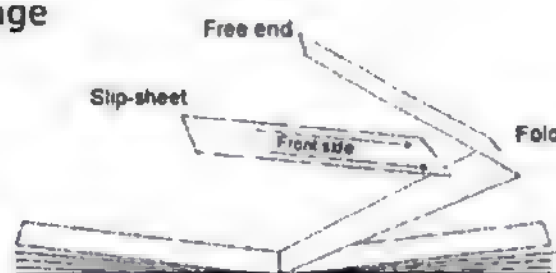


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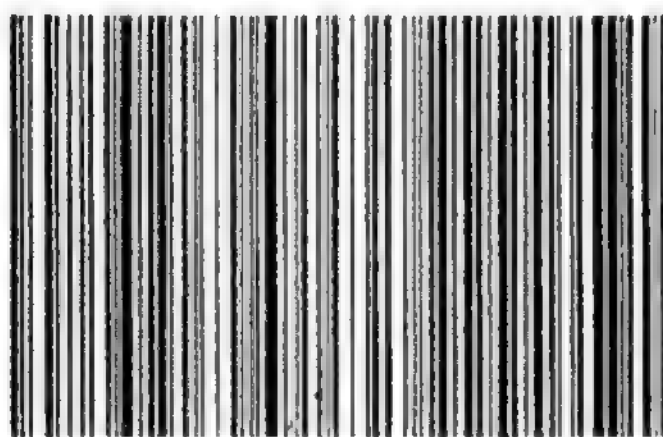
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■ OS/2 Utilities

GammaTech Utilities 2.0: 20 Helpful Tools for OS/2

BY M. KEITH THOMPSON

The GammaTech Utilities are to OS/2 what the Norton Utilities were to DOS back in 1985. Included are 20 programs to make computing under OS/2 more productive. The \$149 collection has data management and recovery features, and many of the programs come in both Workplace Shell and full-screen character versions.

The programs bring conveniences advanced DOS users have enjoyed for years. A disk optimizer keeps HPFS (High Performance File System) volumes at their optimal performance levels, and there are two types of file recovery: The Undelete program recovers as much of a deleted file as possible, and the File Recovery program lets you copy a file containing bad sectors.

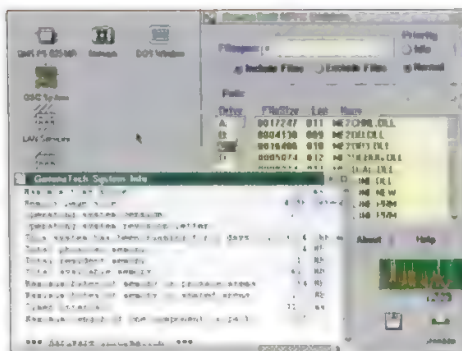
The List Directory utility displays information from your directories in the order that you want it: Files are sorted by date, time, file size, or extension. List Directory also lets you add comments to a file to better explain its contents. Then you can use the File Search utility to find files on multiple drives and to search the file comments that you have attached.

Each menu-driven utility provides a similar Workplace Shell screen format and lets you select operations on multiple drives either with or without subdirectory inclusion. A few of the utilities, such as List Directory (LD) and Delete Tree (DELTREE), only run from the OS/2 command line with optional parameters.

A Data Overwrite program wipes data from your hard disk to Department of Defense specifications, preventing unwanted viewing of sensitive data. Another program, Dirty, sets the "dirty" attribute for a specified

drive: An OS/2 HPFS disk volume becomes "dirty" if the computer goes down without first flushing the disk cache.

The one thing that the GammaTech Utilities could use is more speed in the file searching process. It took 32 minutes for the



OS/2: The GammaTech Utilities' SYSINFO tool tells you about your system.

Undelete utility to search a 646MB hard disk for a file to re-

cover. Other operations are similarly slow.

Despite this speed issue, however, the GammaTech Utilities is an easy-to-use collection of worthwhile tools. It's a must for any OS/2 power user as well as for any network administrator running LAN Manager hosted on OS/2.

• **List price:** GammaTech Utilities, Version 2.0, \$149. Requires: 4MB RAM, OS/2 2.0. Gamma-Tech Inc., P.O. Box 70, Edmond, OK 73083; 405-359-1219; fax, 405-359-7391. Circle 424 on reader service card

■ Network Document Management

Search Your LAN for the Right Document With PC DOCS Open

BY STEVE RIGNEY

Document management software gives you a way to put your filing cabinet on a LAN server in electronic form so that anyone can search for and sort on particular words.

PC DOCS, a leader in network document management, has released PC DOCS Open, Version 2.0, a more powerful version of its document management program. It's a Microsoft Windows-based client/server package that provides full text-retrieval capabilities plus complete document management across several different operating systems and databases. Pricing is \$495 for the server and \$295 for each workstation.

PC DOCS Open can handle files produced by many popular Windows apps, including Ami Pro, Microsoft Excel, Microsoft Word for Windows, and WordPerfect for Windows. Support for Lotus 1-2-3 for Windows and e-mail programs such as cc:Mail and Microsoft Mail is upcoming.

The PC DOCS Open Desktop has customizable toolbars and lets you launch the appro-

priate app when you have made a successful search and want to see the files. The program is easy to use and provides context-sensitive help.

You can also use the PC DOCS Designer to customize your search screen, adding as many fields or data elements to your screen as you want.

PC DOCS Open works with a variety of network operating systems, including Banyan's VINES, DEC Pathworks, Microsoft's LAN Manager, Microsoft Windows for Workgroups, and Novell's NetWare.

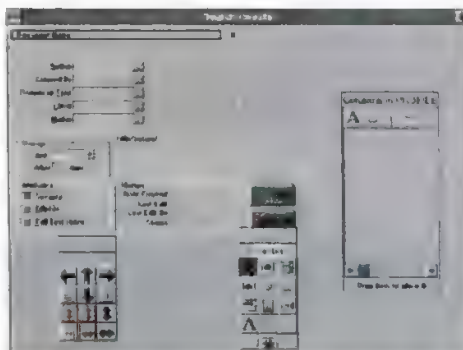
A high level of security and performance comes from PC

to the SQL database engine running in the server, and the server program does all of the searching and sorting. This architecture reduces the network traffic, eliminates the need for powerful processors in every client PC, and speeds response time.

PC DOCS Open works with Gupta Technologies' SQLBase Server, Microsoft SQL Server, NetWare SQL, and Sybase SQL Server for NetWare. You can purchase the program bundled with a runtime version of Sybase, and in the future, PC DOCS Open may be bundled with other SQL databases.

The PC DOCS Open client software contains a text engine for indexing and searching through the actual text of the document once it's delivered from the server. PC DOCS Open also has support for other third-party text engines if you need more advanced features such as conceptual searching.

• **List price:** PC DOCS Open, Version 2.0: workstation, \$295; server, \$495. PC DOCS Inc., 124



DESIGNER: You can build your own searches.

DOCS Open's client/server architecture and its use of SQL database engines. The software in the client PC sends instructions

Marriot Dr., #203, Tallahassee, FL 32301; 904-942-3627; fax, 904-942-1517.

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■ Multimedia Preview

Logitech AudioMan Adds Sound to Windows Apps

BY JULIE COHEN

Logitech won't change the hi-fidelity world with its new Logitech AudioMan microphone and speaker combination. Nor does it want to. All the \$179 AudioMan will do is add sound to Microsoft Windows business applications. You won't be able to play games with it; you won't be able to listen to your favorite CDs or MIDI files.

Logitech was clearly single-minded in designing AudioMan. An 8-bit device with sample rates of up to 11 kHz (input) and 22 kHz (output), the mono system is suitable for Windows 3.1's .WAV files only. Stereo sound cards are typically 16-bit, and the standard for CD quality sound is 44 kHz—specs that are unnecessary for general business applications.

You can create and play back sound files in any Windows application that supports Object Linking and Embedding (OLE) and uses .WAV files (Microsoft Excel 4.0 is an example). AudioMan is not compatible with DOS programs; the pre-release unit we tested also did not support Microsoft MPC applications such as Cinemania and Microsoft Bookshelf, 1992 Multi-



AUDIOMAN: Speakers and microphone in one.

media Edition.

With its 1.8- by 2.2-inch footprint, AudioMan fits easily on a crowded desk. A unidirectional microphone is on top and a curved speaker is below. Logitech kept the design simple: all you see are volume control buttons, an input port for recording sources such as CD or tape players, and a headphone

port. It runs on two 1.5-volt, AA batteries.

Because AudioMan plugs into the parallel port, you never have to open the computer. Its pass-through design also lets you attach a printer.

Less ergonomic is Windows' sound capability. Attaching a 10-second sound note to an Excel 4.0 spreadsheet cell increased the file's size by about 100K, since AudioMan and .WAV files use no file compression.

AudioMan had no trouble recording from across a 12-foot-long office. Nor did the microphone have to be directly in

front of us at all times. Though it picked up a bit of background noise, voices were nonetheless clear and recognizable.

Logitech's AudioMan suits its purpose well. Though it is limited in its applications, the lightweight, cleverly designed device should satisfy business users who want to get the most out of Windows.

• List price: *Logitech AudioMan*, \$179. Requires: *Microsoft Windows 3.1*. Logitech Inc., 6505 Kaiser Dr., Fremont, CA 94555; 800-231-7717, 510-795-8500; fax, 510-792-8901.

Circle 433 on reader service card

■ Word Processing Utilities

Office Accelerator Adds Address Database to Three Windows Word Processors

BY EDWARD MENDELSON

Unless you've spent a few months writing macros for your word processor, you probably don't have a letter-writing system as automated as the one you get with Baseline Data Systems' \$129.95 Office Accelerator.

This Microsoft Windows utility runs inside Microsoft Word for Windows, or, with minor limitations, inside Ami Pro or WordPerfect for Windows. It's built-in database has simple menus that allow you to search for names to which you want to send letters or faxes, and Office Accelerator lets you select from standard formats.

You can send the same letter or fax to one or more recipient. Just type in what you want to say, and the program uses your word processor to send your faxes or print your letters, complete with envelopes or labels.

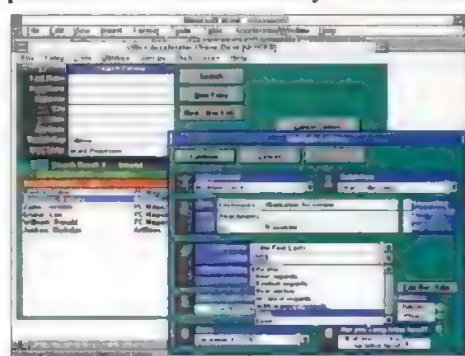
You start Office Accelerator by choosing whether to write a letter or fax, or to print a label or envelope. Then you search the phonebook database for names, keywords, addresses, or distribution lists. You can combine multiple searches.

The program opens a form in your word processor where you fill in your text, and then you get

options to print any combination of envelopes, labels, and letters. Office Accelerator can also print part of all of its phonebook in standard diary

perb concept that's only slightly flawed. You can import ASCII database files into the phonebook, but you need to write out a list of fields in the import file and coordinate it with options in the program's import menu. Some keyboard shortcuts don't work, so the program makes you resort to the mouse without warning.

Despite some minor growing pains, this package offers more automation and



MULTIPLES: Office Accelerator's options for multi-copy letters.

customization than any other letter-writing software for Windows. It is sensibly designed for ordinary office tasks, and customizable enough for extraordinary ones.

• List price: *Office Accelerator, Version 1.0*, \$129.95. Requires: 2RAM; *Microsoft Windows 3.0* or later; *Ami Pro*, *Word for Windows*, or *WordPerfect for Windows*. Baseline Data Systems Inc., 3625 Del Amo Blvd., #245, Torrance, CA 90503. 800-522-5939, 310-214-8528; fax 800-437-3299.

Office Accelerator is a su-

Circle 421 on reader service card

Data Management

askSam: Free-form Data Manager Gains GUI Strength

BY DAVID DEJEAN

The data manager askSam wears many hats. It's a venerable database manager, a word processor, and an information manager, but few have admired its plain, positively ascetic interface—a couple of control panels, a few function keys, and a command line. Compared with askSam, any Windows implementation would look like a rococo riot. With its latest version, askSam for Windows (\$395), the program has gained what it's always needed—a user interface—but has lost the speed of the DOS version.

Also known as a free-form information manager, askSam has always been good for both highly structured applications that deal with searchable text, such as bibliographic databases, and the sort of totally random data that made askSam a PIM before PIMs were invented. Chuck your phone notes, memos, to-do lists, and laundry lists into an askSam file and search for them by whatever you can think of—a word, a name, or a single digit.

askSam actually came through the Windows transformation better than some other DOS apps. The screen is loaded with the standard Windows menu bar, an icon bar for File and View commands, a *second* icon bar for text formatting and font selection, a command line, a

in the Windows version is programmability. Over time, askSam developed an extensively programmable interface; it could be used to build custom data entry and lookup applications. A separate developer's edition is even available for the DOS version. That functionality is in basic conflict with the Windows philosophy.

At least the strongest feature of the DOS version is still strong in the Windows version: askSam has always been a whiz at handling large amounts of text.

When dBASE was just learning how to manage notes fields, askSam was offering lightning-fast full-text searches of lengthy records.

And because the program searched full text, it wasn't fussy about the shape of the data. It could build reports out of implied fields ("the six digits after a dollar sign within three words of 'total cost'—") as fast as other database managers could search their carefully built indexes.

A TEAM PLAYER

The program has preserved its strong text capabilities and even builds on them. In Windows, askSam makes a great team player in a suite of Windows applications. Task-switch into it with a keystroke and jot a note or use the Windows Clipboard. Paste graphics into the file or

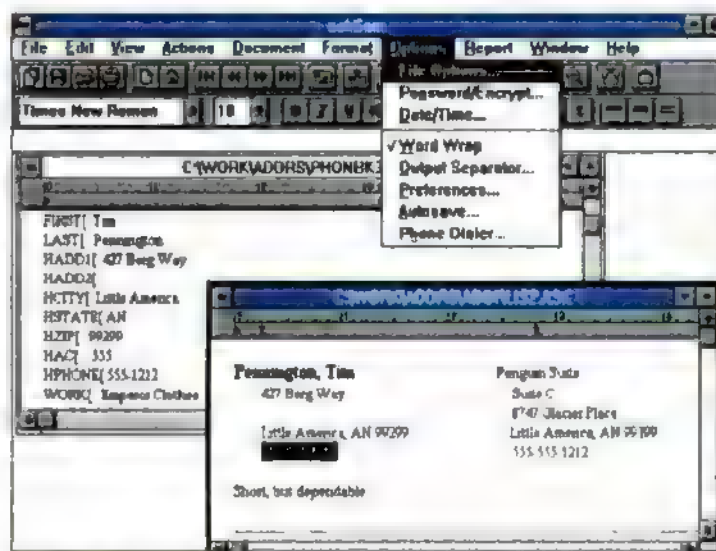
use the program as an Object Linking and Embedding (OLE) client and store a library of Microsoft Excel worksheets, then just search for the worksheet you need right in askSam and edit it in place.

Windows also helps with importing data. askSam for Windows eliminates the DOS version's finicky distinctions between records and documents that make importing data tedious.

The benefits of the GUI environment are most apparent when askSam is prompting you through a tangled Boolean query. The vocabulary of radio buttons and list boxes makes proximity searches easy with multiple ANDs and NOTs.

Windows is almost as useful when you're laying out a report, but the graphical interface breaks down when confronted with the complexities of askSam's reporting language and casually structured data. The report generator, more than any other component, looks like work in progress.

The good news for askSam mavens is that almost all the codes and commands you know so well still work in the Windows



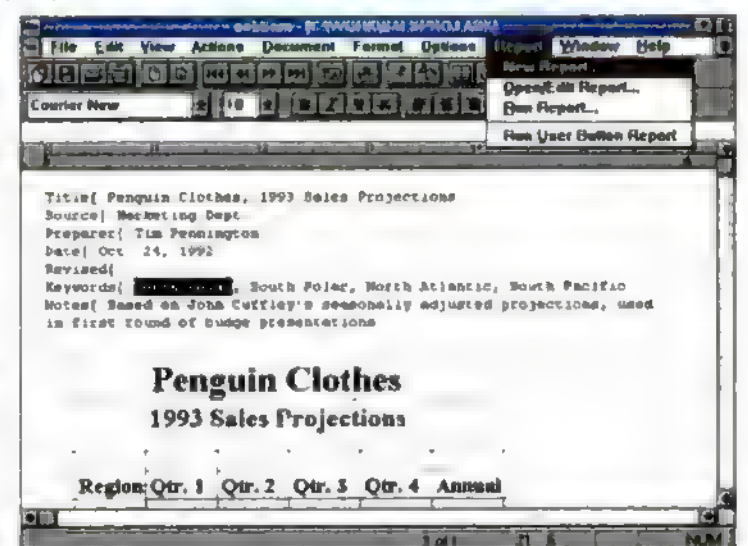
REPORTS: askSam's graphical report generator.

ruler in the file window, and a status line. Fortunately, most of these can be turned off, so the user who pines for DOS can almost recreate the control-panel-and-command-line austerity of the askSam of old.

While Windows really strengthens the program in areas where the DOS version is weakest—the process of framing a complex query or designing a report—there's a price that must be paid when any DOS app goes GUI.

What was lean, mean, crisp, and responsive in DOS (once you learned how to put it through its paces), is mushy, bulky, and sluggish in Windows. The computational overhead of Windows makes askSam's searches a bit slower, and the impression of slowness is exacerbated by the mouse clicking, menu dragging, and dialog boxing that has replaced the terse keystroke vocabulary of the DOS-based product.

The major missing element



GUI: Icons make tools available.

version. The bad news is that if you don't already know those codes and commands by heart, there isn't much in the Windows interface that will help you use them effectively.

askSam retains its hallmark combination of flexibility and power, but there's still work to be done before a fluent Windows interface matches askSam's capabilities. □

FACT FILE

askSam for Windows, Version 1.0

askSam Systems, P.O. Box 1428, Perry, FL 32347; 904-584-6590; fax, 904-584-7481

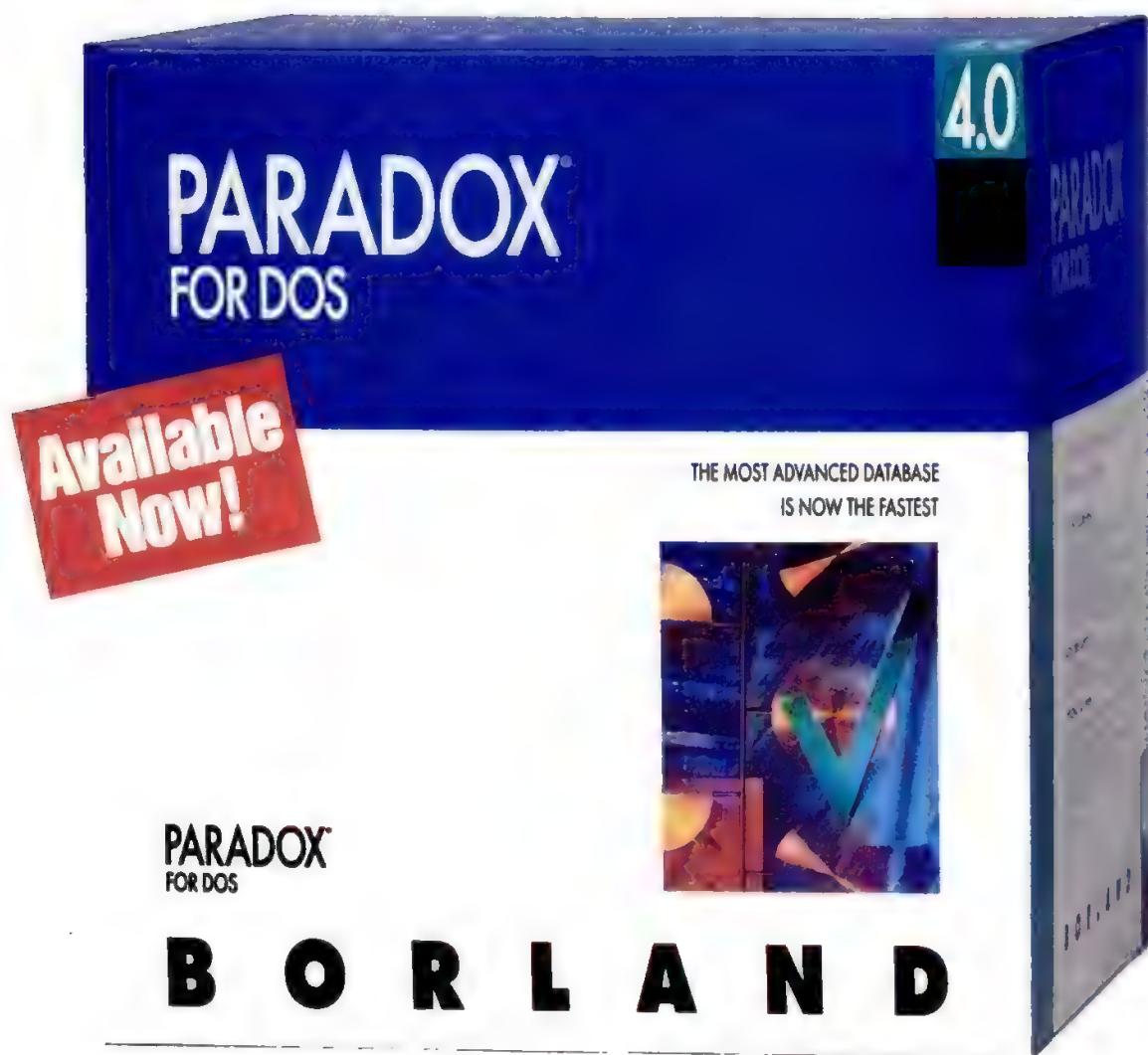
List price: \$395.

Requires: 4MB RAM, 2.5MB hard disk space, Microsoft Windows 3.0 or later.

In short: The first Windows version of this venerable DOS database manager puts improved query and report generation in a graphical environment. What's missing are the speed and programmability of the DOS version.

418 ON READER SERVICE CARD

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Independent tests (*InfoWorld*, September 1992) prove that new Paradox® 4.0 is the fastest, most powerful database among those tested. And it's available now! (Compare that with Microsoft's offer. They want you to pay \$200 now for a slower product with the promise of getting an unannounced upgrade as soon as it comes off the vaporware list.)

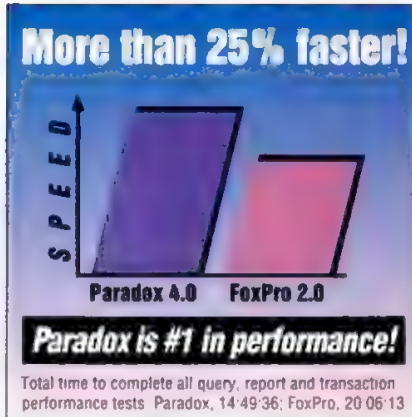
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Thanks to Borland's new WarpSpeed™ performance, Paradox 4.0 sets the standard in performance for both network and stand-alone use. For you, this means faster answers to queries, faster memory access, and faster multiuser applications. (Don't be misled by Microsoft ads that claim FoxPro is the fastest. It's old news.) As *InfoWorld* put it in the speed tests for Querying/Reporting: "Paradox is the hands-down winner, not only in speed, but in maintaining an amazingly consistent performance as the tests became more complex."

Unmatched power and ease of use

In addition to unmatched performance, Paradox 4.0 sports a new windows-like interface with pull-down menus, dialog boxes, windows, and mouse support. This new interface makes Paradox the most usable database for everyone in your corporation.

Paradox is renowned for its ease of use. Paradox introduced Query By Example, the easiest way ever for users to get at their



"Tuned-up Paradox 4.0 speeds past FoxPro 2.0."
InfoWorld product comparison, September 28, 1992.

data. And Paradox forms and reports are a snap to create. You can even build multi-table forms and reports, all without programming.

With Paradox 4.0, you can also manage more types of data in more ways than ever before. Paradox 4.0 includes memo fields for storing unlimited amounts of text. And new binary fields let you store any type of information—documents, spreadsheets, pictures, sound, and even multimedia.

Application development is faster, too

When it comes to application development, Paradox is ready. The Paradox Application Language (PAL™) is a powerful, high-level procedural language that allows you to cre-

ate sophisticated applications quickly. And the new Application Workshop helps developers build and distribute robust applications in record time. Now you can create custom applications that users love.

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Paradox 4.0 provides a smooth migration from earlier versions. It runs all your existing Paradox 3.5 applications and can access your data transparently. What's more, Paradox talks to more of your corporate data than any other PC database, with transparent links to Oracle, Sybase/Microsoft, DEC VAX Rdb, IBM® OS/2® DBM, DB2, Novell NetWare, and InterBase™ server.† (By comparison, FoxPro talks only to itself.)

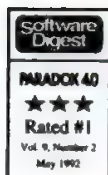
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Put the world's fastest database to work for you.

To upgrade or order, see your dealer today or call 1-800-331-0877, ext. 6062

In Canada, call 1-800-461-3327



Paradox 4.0
May 1992



Paradox 4.0
August 1992



Paradox 3.5
June 1992



Paradox 3.5
June 1992



Paradox 3.5
October 1991



Paradox 3.5
May 1991



B O R L A N D
Software Craftsmanship

†Paradox SQL Link sold separately. InterBase connection available soon. Copyright © 1992 Borland International, Inc. All rights reserved. Paradox, WarpSpeed, InterBase, and PAL are trademarks of Borland International, Inc. PC Magazine Editor's Choice Award reprinted from PC Magazine, May 28, 1991. Copyright © 1989, Ziff Communications Company. Software Digest is a registered trademark of NSTL, Inc. BI 4907.1

CIRCLE 220 ON READER SERVICE CARD

■ Spreadsheets

SmartIcons and Speed Keep 1-2-3 3.4 Competitive

BY CRAIG STINSON

Ever since Lotus 1-2-3, Release 3.0, made its debut in 1988, Lotus's efforts to pitch it to spreadsheet power users have been undermined by the superior performance and usability of Release 2.x.

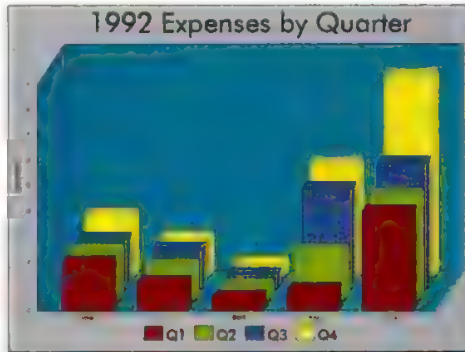
With the arrival of the \$595 1-2-3 for DOS, Release 3.4, Lotus can finally make a compelling case for upgrading from Release 2.x. The latest offering is fully as usable as Release 2.4, nearly as nimble on-screen, and faster than Release 2.4 at recalculating large and complex worksheets.

The most important improvements in Release 3.4 concern performance. Lotus has juiced up the calculating engine; on arithmetic benchmark worksheets, Release 3.4 turned in recalc times that were, on average, 22 percent shorter than those of Release 3.1 Plus and less than 1 percent longer than those of Release 2.4 models that forced Release 2.4 to use expanded memory. Release 3.4 outperformed it by quite a wide margin.

To the graphing section of 1-2-3, Lotus has added three-dimensional line, bar, pie, and area types, in which each data series is plotted in a separate plane. Other graphing improvements include the ability to suppress any portion of the graph frame (the border drawn around the entire chart) and an option to display chart data as a table beneath the graph itself, an especially nice addition.

USABILITY BOOST

The remaining changes bring Release 3.4 up to the level of Release 2.4 in terms of usability. The Del key now deletes, and dragging with the mouse now



BETTER BARS: Improved graphing tools.

selects cell ranges (no more need to press F4 before dragging). Landscape-mode printing is finally available for dot matrix printers, trace mode now displays the address and contents of the current macro cell, and a

"-W" command-line switch lets you run 1-2-3 with a particular worksheet in place. Like Release 2.4, the new product also offers optional setting sheets to help you keep track of printing, graphing, and global default options.

The most visible usability enhancement is the SmartIcon palette that now adorns the right

edge of the new 1-2-3's screen. Like the similar feature in Release 2.4, it's handy and customizable but poorly documented. Although there are about 100 built-in icons and 12 slots for your own additional icons, you should hang on to that quick-reference booklet; it's the only place where you can find out what all these icons do.

• List price: *Lotus 1-2-3 for DOS, Release 3.4*, \$595; upgrade, \$150; competitive upgrade from *Quattro Pro for DOS*, \$150. Requires: 1MB RAM, DOS 3.0 or later. Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, MA 02142; 617-577-8500.

Circle 425 on reader service card

■ Scanners

\$699 Plustek Color 6000: A Bargain for Basic Scanning

BY MITT JONES

With the \$699 ScanPlus-Color 6000, the question isn't whether this sheet-fed scanner delivers considerable value, but whether the value it delivers is able to meet your specific scanning needs.

Manufactured by Plustek USA, the Color 6000 offers 24-bit color capability at resolutions as high as 300 by 320 dots per inch and it also comes with Micrografx's Picture Publisher 3.0 LE.

Other assets of this single-pass scanner include its HP ScanJet IIc emulation and its small chassis, which measures a mere 3 by 13.25 by 9.6 inches.

As with fax machines, sheet-fed scanners move the page past a stationary light source in a straightforward fashion. This design makes such scanners relatively inexpensive compared to flatbed models.

To its credit, the Color 6000

will accommodate a wider range of page sizes than is accommodated by many other sheet-feeder mechanisms. The straight-through feed will accept materials as thick as 1/8 inch and



ONE-PASS COLOR: The Color 6000 offers 24-bit color.

as narrow as 2 inches or as wide as 8 1/2 inches. Keeping the sample straight can be difficult with narrow pages, however.

But the scanner does suffer from some feed-related drawbacks. The input bin accepts only one page at a time, a limitation when you need a scanner primarily for optical character recognition.

You may also find that the scanner's small footprint won't save much desktop space, since the scanner has to be placed 11 inches or so from the back edge of your desk to leave enough room for an output stack.

The Color 6000 took just under 3 minutes to scan a 4- by 6-inch photograph at 300 dpi, and took 30 seconds to scan a page of text. The scanner won't

match the color quality of the HP ScanJet IIc in most circumstances, but its output quality should be sufficient for basic color needs.

The ScanPlus-Color 6000 lacks the versatility and scan capabilities that desktop publishing professionals will demand, but for those who need only basic color page scanning

capabilities at a bargain price, it delivers.

• List price: *ScanPlus-Color 6000*, \$699. Requires: 2MB RAM, 10MB hard disk space, Microsoft Windows 3.0 or later. Plustek USA Inc., 3550 Scott Blvd., Bldg. 46, Santa Clara, CA 95054; 800-685-8088, 408-980-1234; fax, 408-980-5184.

Circle 434 on reader service card

■ Statistical Software

Systat for Windows: All-in-One Functionality

BY JAMES KARNEY

While it may be hard to calculate the odds of Microsoft Windows becoming the dominant environment for statisticians, the number of available statistical packages keeps increasing. Systat for Windows, a recent \$895 entry, offers an array of features similar to its DOS counterpart's, but its much-better interface is tailored for the Windows desktop. Unlike the DOS version, there are no add-on packages; everything is contained in one application.

Systat for Windows is a robust general-purpose statistics program, offering a range of procedures from the basics—like simple regressions and frequency analysis—to complex nonparametrics, cluster analysis, and multidimensional scaling. Systat has the most complete set of graph types of any PC-based program.

All program functions are contained in five independent windows, each with pull-down menus and on-line help. The main window displays the results of all operations and the variables contained in the cur-

rent file, and it provides access to the other windows.

There are two ways of performing most tasks. You can use menus, a button bar, and dialog boxes to set up and run a procedure. Or you can use a command language to prepare a reusable script. Most novices will find the button bar a real plus, since it provides easy access to the more commonly used procedures.

Another concession to the occasional statistician is the Magnifying Glass tool. Placing its cursor over a variable in the main window allows you to run several predefined routines or charts with just a mouse click.

COMMAND LANGUAGE

Veterans will most likely opt for using the command language to perform tasks and automate operations. Since all Systat editions use the same language, you can use procedures and macros across platforms. The results can be exported into one of several popular spreadsheet or database formats or copied to the Windows Clipboard and pasted into another program.

Cases (actual data) are con-

tained in the Worksheet, which is much like a spreadsheet. You can enter data directly, or import it from ASCII, .DBF, .DIF, .WKx, and .XLS files. The data sets can be moved, copied, pasted, or edited just as in a spreadsheet.

If you plan to import data, be

display or output using any available TrueType font on your system.

There are a few shortcomings with the user interface. The program uses spaces to position characters, so nonmonospaced fonts may look ragged when you export them into a word processor. Tabs would be a nice addition. And working in one window will stack all the others behind it unless you have tiled them on the desktop.

The menus are well designed, making Systat's features easy to locate, so new users should be able to perform basic functions with little practice. But mastery will take both experience and a working knowledge of statistics.

SNAPPY PERFORMANCE

Unlike most other PC statistics programs, Systat began as a microcomputer application. Today, there are DOS, Macintosh, Windows, and VAX/VMS versions available; features, user interface, and price vary with each edition.

We experimented using several files with a variety of data set on two 486 computers, one with 8MB, the other with 16MB of RAM. One test used a series designed to evaluate statistical software published in the *Journal of the American Statistical Association* (Longley, J.W. September, 1967). The machine with more memory completed the series in 6.5 seconds, the other in just over 8 seconds—with accurate results. One of the company's technical support staff noted that a faster hard disk may make more difference than increased RAM, based on the way the program works.

Statistics experts interested in representing results graphically will find Systat for Windows a most able performer, and anyone needing to take stats work on the road will appreciate its performance on less powerful systems. It provides a good balance between ease of use and performance for anyone willing to take the time to learn its functions. □

FACT FILE

Systat for Windows, Version 5.01

Systat Inc., 1800 Sherman Ave., Evanston, IL 60201; 708-864-5670; fax, 708-492-3567

List price: \$895, upgrade, \$250

Requires: 2MB RAM, 6.5MB hard disk space, Microsoft Windows 3.1

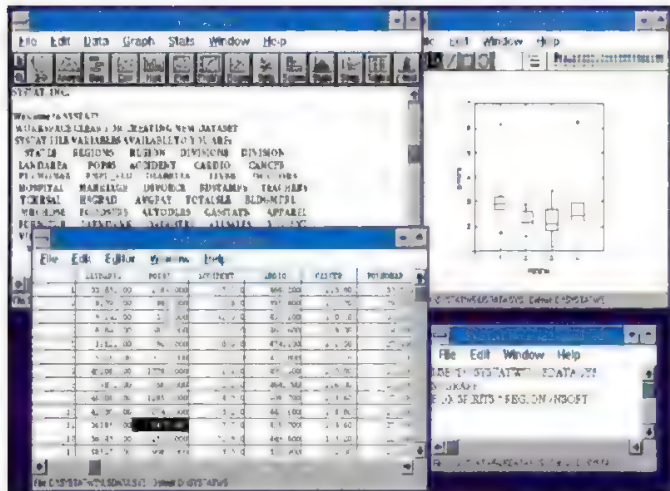
In short: A good Windows implementation of a well-known DOS statistical program, Systat for Windows offers all of the features that most statistics users will ever need

ON READER SERVICE CARD

aware that the source files may need some cleaning up first. Systat doesn't recognize formulas or blank lines during import. We tried a file that included both, and at one point we locked up the program. Removing the offending portions eliminated the problem.

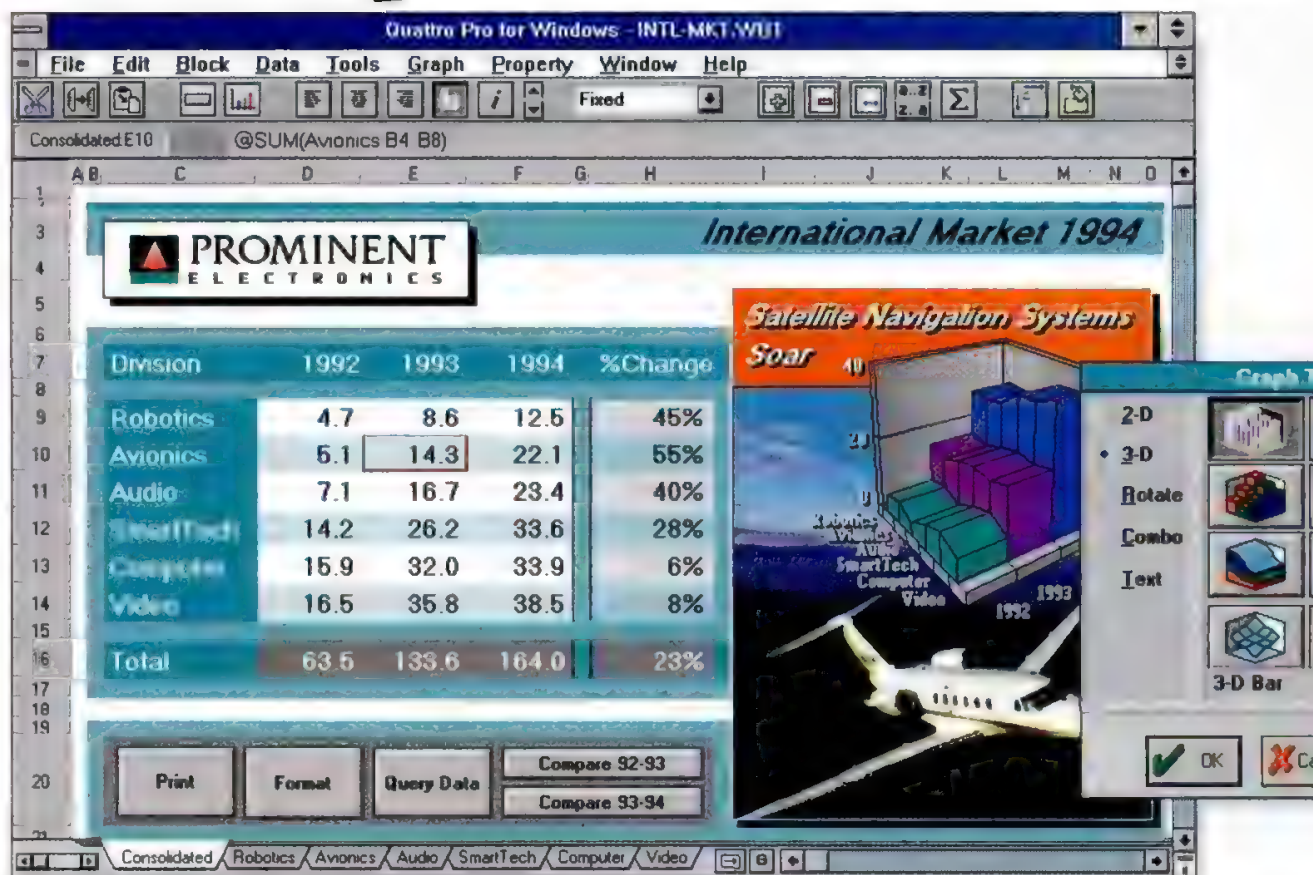
Graphs are displayed and manipulated in their own window, with basic tools for adding text, annotations, and arrows, and for setting colors. While the actual graphs may look more like the output of a plotter than a presentation program, the scope and power of Systat's graphic engine is hard to beat.

Also included is a notepad window, which is used as an alternate location for setting up command routines, editing text, or massaging data that can then be exported. All of Systat's output can be formatted for screen



COORDINATION: Systat modules appear in separate windows.

Excel and 1-2-3-Quattro Pro



Quattro Pro for Windows is the easiest-to-use spreadsheet ever made. Built with Borland's renowned object-oriented technology, Quattro® Pro for Windows is packed with hot new features you won't find in any other spreadsheet.

NEW! Spreadsheet Notebooks with customizable Tabs are nothing less than a revolution in spreadsheet ease of use. Now you can intuitively organize and manage your spreadsheet data.

NEW! Object Inspector™ menus end the hassle of searching through menus. They're simpler than 1-2-3. Just click the right mouse button anywhere on the screen to get a list of what you can change and change it right there.

NEW! Database Desktop™ is the easiest way to incorporate dBASE® and Paradox® data into your spreadsheet. Just what you'd expect from Borland, the leader in database technology.

NEW! SpeedFill™ and **SpeedFormat™** slash setup time by automatically filling in spreadsheet headings and formats.

NEW! SpeedBars™ are customizable and context-sensitive. SpeedBar icons give pushbutton access to your most frequently used commands.

NEW! Presentation Graphics and drawing tools that rival those of Freelance and Harvard Graphics are built-in. You don't need to buy a separate graphics package.

YES! Compatible with Lotus 1-2-3 files, macros, and publishing styles; Excel .XLS files; and eight graphic formats. Quattro Pro for Windows offers the best spreadsheet, database, and graphics file compatibility available.

-3 users prefer for Windows

An independent test proves...

It's a fact: two out of three Excel and 1-2-3 spreadsheet users tested prefer Quattro Pro for Windows to their current spreadsheet. They say it makes you more productive and is easier to learn and use. That's the result of a study conducted by

Usability Sciences Corporation, a highly regarded independent testing lab used by major software publishers, including Lotus.

▶ *The Object Inspector makes it easy to view and select your options.*

▼ *WYSIWYG printing makes it easy to create high-impact reports.*

...the easiest-to-use spreadsheet...

OBJECT INSPECTOR



Quattro Pro for Windows is the most advanced, yet easiest-to-use spreadsheet ever created for the personal computer.

Thanks to the use of new object-oriented technology, Borland has radically simplified the use of the world's most feature-rich spreadsheet. With Quattro Pro for Windows you get your work done faster because you work visually. Simple point-and-click operations are all that's needed to complete any spreadsheet task—from building your spreadsheet to creating dazzling graphical reports.

...makes you more productive

Never before has so much spreadsheet power also meant this much user productivity. Spreadsheet Notebooks and Object Inspector menus are breakthrough concepts that make it easy to tap the awesome functionality of Quattro Pro.

Only Quattro Pro for Windows gives you transparent access to database information. Borland's unique Database Desktop™ lets you view, edit, and copy dBASE

and Paradox tables directly from within Quattro Pro. Plus, we've included all the tools you'll ever need for creating your own custom spreadsheet applications.



Quattro Pro for Windows
November 10, 1992

**"Quattro Pro
for Windows is a
better spreadsheet
than Excel 4.0."**

—Computer Shopper, November 1992

1-2-3 and Excel users tested prefer Quattro Pro for Windows two to one. But why not see the world's best Windows spreadsheet for yourself? Get Borland's new Quattro Pro for Windows today.

**See your dealer
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ext. 5921**

In Canada, call 1-800-461-3327.



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CIRCLE 287 ON READER SERVICE CARD

New & Improved

NEWS OF ANNOUNCED PRODUCTS AND UPGRADES

By Emerson Andrew Torgan

NEW

Dell Rolls Out Its Largest Product Launch

Dell Computer has unveiled 18 new 486-based systems that are upgradable to higher-speed Intel 486 processors and to Pentium-based processor technology (when it becomes available). The desktop and tower systems also feature an integrated local-bus video subsystem and embedded system diagnostics.

The systems are based on Intel 486SX, DX, and DX2 processors running at 25, 33, 50, and 66 MHz, and are separated into four families. The 486/L series consists of five low-profile-chassis, ISA-based PCs with prices starting at \$1,200; the 486/M series has five midsize ISA-based PCs starting at \$1,450; the 486/ME series consists of five midsize EISA-based PCs starting at \$1,750; and the 486/T series includes three ISA-based tower systems, beginning with a 33-MHz 486DX-based PC priced at \$1,950. All systems ship in base configuration with 4MB RAM, an 80MB hard disk, and one 5.25-inch or 3.5-inch floppy disk drive. Monitors are not included.

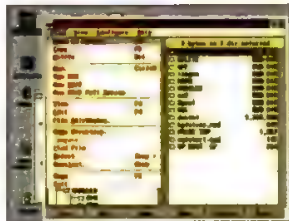
Dell's new systems feature a "snap-together" design, and some have an innovative new Expansion Card Cage that is easily removed (cards in place) to provide access to the motherboard. Some of the most frequently serviced components in the system (disk drives and the motherboard) snap into place with quick-release devices. Externally accessible devices (tape drives and floppy disk drives) snap in and out of the front of the chassis.

Each of the systems employs an advanced set of embedded diagnostics programs, stored in flash memory. The new diagnostics have the ability to detect a wide range of failures, down to the component level. As a result of the diagnostic programs being stored in flash memory, they are able to pinpoint problems even when the system will not boot its operating system from a floppy disk. Additional features include the use of faster chip sets, improved memory architecture, and an optional 128K external cache, according to Dell.

- List price: 486/L series, prices start at \$1,200; 486/M series, prices start at \$1,450; 486/ME series, prices start at \$1,750; 486/T series, prices start at \$1,950. Dell Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759; 800-289-3355, 512-338-4400; fax, 512-338-8700.

Circle 403 on reader service card

HOT PROSPECT



Symantec Ships The Norton Commander for OS/2

Symantec is in the business of trying to make computing easier, and OS/2's Workplace Shell could use some help. The Norton Commander for OS/2, Version 1.0, is the first file management utility software for OS/2, providing file management and finding capabilities, a file viewer, an applications menu, and network menuing support. The Norton Commander for OS/2, Version 1.0, places related operations in a single window rather than opening the several windows OS/2's Workplace Shell requires to perform similar file management tasks.

Commander for OS/2 lets you manage your HPFS or FAT files in full graphical mode from the desktop. File management operations are integrated into one central window. A graphic tree and file list display lets you view the contents of folders and drives. The global file-find utility lets you search for files, including wildcards, by name or extension and display them in a scrollable list. Files can then be launched or viewed, or you can go to the folder where the file is located.

Commander's configurable Norton Menu lets you launch frequently used applications, and you can add applications to the menu by dragging and dropping them. In fact, two different drag-and-drop modes are available.

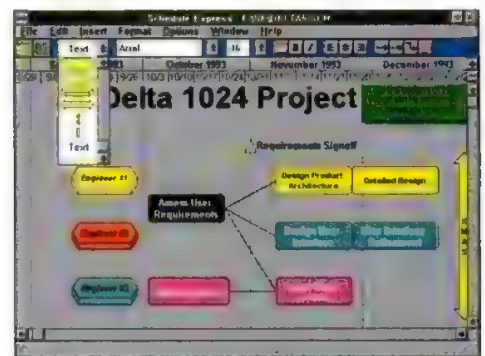
- List price: The Norton Commander for OS/2, Version 1.0, \$149. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 800-441-7234; 408-252-3570. Circle 401 on reader service card

NEW

Schedule Express Simplifies Project Scheduling

Fountain Microsystems is shipping Schedule Express for Windows, Version 1.0, a Windows-based graphics editor designed to help non-project-management professionals create project schedules. It offers control over schedule layouts, including position, style, font, and color for each task and milestone.

Schedule Express lets you build schedules simply. You input tasks by dragging and dropping them anywhere on the schedule and then selecting task duration. A variety of milestone



Schedule Express for Windows, Version 1.0.

graphical elements are available, such as rectangles, arrows, and 3-D bars.

Tasks can be linked to illustrate dependency relationships. Up to 500 tasks per schedule may be stored, and there is a variety of schedule viewing and printing options.

- List price: Schedule Express for Windows, Version 1.0, \$129.95. Fountain Microsystems Inc., 1516 Oak St., Alameda, CA 94501; 510-814-1695; fax, 510-814-1696.

Circle 402 on reader service card

IMPROVED

Crystal Reports 2.0 Gains Interface Features

Crystal Services' Crystal Reports 2.0 for Windows is a Windows-based data-access and reporting tool that gives you access to dBASE, Paradox, FoxPro, and Btrieve databases. The update provides access to more corporate data sources, has an enhanced user interface, and includes new data manipulation features.

New & Improved

Improvements to the interface include the addition of a ruler and status bar. New options for improving the appearance of reports are available, such as the ability to add bitmap graphics, borders, and shadows around fields. A new line-drawing capability lets you create lines, boxes, and tables in reports. The update also supports OLE (Object Linking and Embedding). Enhanced data-manipulation features include additional formula functions, variance and standard deviation total types, and database linking methods.

- List price: *Crystal Reports 2.0 for Windows*, single-user version, \$195; *Crystal Reports LANPAK*, five-user version, \$395. *Crystal Services*, 1050 W. Pender St., #2200, Vancouver, BC, Canada V6E 3S7; 604-681-3435; fax, 604-681-2934.

Circle 404 on reader service card

NEW

Harvard Graphics for Windows Gets a Video Player

Software Publishing Corp. is shipping Video Player for Harvard Graphics for Windows, which makes it easy to incorporate fully scalable digital video clips into ScreenShow presentations. The new player supports Microsoft Video for Windows and Intel Indeo video, as well as Intel's ActionMedia II DVI boards.

Video Player lets you size and position a video playback window and select either manual or automatic playback modes. You can control the volume of a video and set playback options that allow you to proceed to the next slide in a presentation either before or after playing a video clip. Video Player will be available to current users of Harvard Graphics for Windows for a \$15 shipping-and-handling fee through April 30, 1993.

- List price: *Video Player*, \$15 shipping and handling charges through April 30, 1993. *Software Publishing Corp.* 3165 Kifer Rd., P.O. Box 54983, Santa Clara, CA 95056; 408-988-7518.

Circle 406 on reader service card



Video Player adds video to presentations.

BRIEFS

SOFTWARE

Calculus is shipping EZ-Fax, Version 3.6 (starting at \$499), and is introducing its "bumpable" technology. Users start with a small fax server investment and add network users one by one (or in little "bumps") and avoid the up-front expense of an unlimited user license. EZ-Fax 3.6 ships with a 9,600-bps network-ready fax card and server software. 305-481-2334; fax, 305-482-1866.

Calera Recognition Systems is shipping FAXGrabber, Version 1.2 (\$89), featuring expanded support for fax software and improved accuracy. Version 1.2 adds support for Delrina's WinFax Lite, The CompletePC's RapidFAX, and Bit Software's BitFax. 408-720-8300; fax, 408-720-1330.

Corel Corp. is shipping a network-ready version of CorelDRAW 3.0 (\$595) as a \$149 upgrade to registered users of CorelDRAW 3.0. 800-836-3729, 613-728-8200.

Microsoft has announced the TrueType Font Pack 2 (\$69.95), which ships with 44 new TrueType fonts and a new Font Assist application for organizing all TrueType fonts. The company is also shipping the Microsoft Hewlett-Packard Font Set, a collection of 35 TrueType fonts designed to upgrade any Hewlett-Packard LaserJet, DeskJet, or PaintJet printer with the same TrueType fonts that are resident in the new HP LaserJet Series 4 printer. 800-429-9400, 206-882-8080; fax, 206-936-7329.

ProWorks is shipping Flipper 6.0 (\$349), a library designed to provide graphics for Clipper applications. The update includes a virtual memory system that lets you place additional data points in graphs and objects in CAD drawings. The number of data points is limited only by the amount of available XMS and EMS memory. The new version also features enhanced CAD functionality and expanded 3-D graphics. 503-567-1459.

Que Software is now shipping its RightWriter 6 for Windows and DOS (\$99.95), a new version of its grammar

NEW

Moses Computers Proclaims "Let My People Network!"

Moses Computers has announced MosesWIN!, a peer-to-peer network solution compatible with Microsoft Windows for Workgroups, Microsoft LAN Manager 2.2, and the upcoming Windows NT, according to the company. It also offers program, file, and printer sharing under DOS. MosesWIN!, based on the company's existing 2 megabit-per-second peer-to-peer network, MosesALL!, and includes the necessary hardware, software, and cabling to connect up to eight PCs via the company's DirectStar technology. At \$129 per node, the system can be upgraded to 4 mbps can connect to up to 53 PCs via the MosesUP! for Windows NOS accelerator disk for \$99 per site.

- List price: *MosesWIN!*, \$129 per node. *Moses Computers*, 15466 Los Gatos Blvd., #201, Los Gatos, CA 95032. 408-358-1550.

Circle 407 on reader service card

NEW

R&R Report Writer for Windows Lets You Access dBASE Files

Concentric Data Systems is shipping R&R Report Writer for Windows, which gives you Windows access to data that is not Windows-based. An access and reporting tool, it lets you design reports in dBASE and compatible (.DBF) files. Databases supported include dBASE III, dBASE III Plus, dBASE IV, and dBASE-compatible programs such as Computer Associates' Clipper 5.0, Microsoft's FoxBASE+ and FoxPro, WordTech's Arago, and Alpha Software's Alpha Four.

According to the company, R&R Report Writer for Windows incorporates band-oriented report writing technology and is menu driven, eliminating the need for programming in order to create database reports. Using pop-up menus, reports can be designed, tested, and fine-tuned on-screen. Report definitions can be stored for future use or can be modified for use as templates. Additional features include a relational merge feature that lets you prepare form letters from relational dBASE-compatible files, and a mail-merge feature that lets you merge word processing documents into reports and generates mailing labels.

- List price: *R&R Report Writer for Windows*, \$249; *multiuser three-pack*, \$695; *multiuser six-pack*, \$1,249. *Concentric Data Systems Inc.*, 110 Turnpike Rd., Westborough, MA 01581; 800-325-9035, 508-366-1122; fax, 508-366-2954.

Circle 409 on reader service card

Borland's

Get an extra 2 hours out

dBASE gets the job done faster

Recently, Usability Sciences, the leading productivity research firm, conducted tests comparing dBASE IV® with FoxPro. For everyday tasks like creating reports, browsing, linking, and using linked data, dBASE® users got their work done 25 percent faster.

The secret to "user-ability"

The Control Center makes complex tasks easy, and simple tasks automatic. Unlike the competition, dBASE is not merely a developer's tool. For those who *are* developing custom applications, the dBASE language sets the standard for power and productivity. But it's the dBASE Control Center that makes dBASE a favorite among



**FoxPro:
109
minutes**

**dBASE:
82
minutes**

dBASE takes less time to get the job done.
In independent tests using both dBASE and FoxPro, users got their work done 25 percent faster with dBASE. That's like getting an additional two hours of work done every business day. Now that's productivity!

all users. You don't have to learn the dBASE language before putting the power of dBASE to work for you.

Intuitive tools eliminate guesswork

The dBASE Control Center puts you in charge, with the power to see and access everything at a glance. Its straightforward, task-oriented interface gives you single-keystroke or mouse-click access to dBASE's power. So you can perform all your daily tasks without ever seeing a dot prompt (unless, of course, you *want* to). And the Control Center's open architecture makes it easy to enhance or customize your own dBASE applications by incorporating third-party add-on products. No wonder NSTL rated dBASE tops in versatility and usability.* And why *ComputerWorld* ranked dBASE the #1 PC development tool for DBMS client/server software.

Get results fast

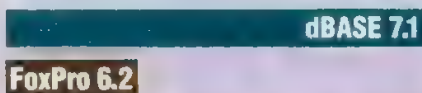
Powerful Design Tools let you create database tables, queries, data entry forms, reports, labels, and applications interactively. So you can see the results onscreen as you work.

Versatile Report Writer gives you the widest choice of report styles available, with many text enhancement features to add clarity to your data.

More versatile . . . more usable



Versatility Rating—more versatile means dBASE fits your business better



Usability Rating—dBASE is the most usable database for business today

*NSTL found dBASE to be the favorite of both novice and experienced users alike in Overall Usability and Versatility.**

dBASE IV

of every business day!

I/S prefers doing business with dBASE

	Borland dBASE	Microsoft® FoxPro
Installed in Company	#1	#5
Best Technology	#1	#4
Best Price/Performance	#1	#3
Best Service/Support	#1	#5
Best Documentation	#1	#4
Prefer to Do Business With	#1	#4
Plan to Buy	#1	#4

Source: 1992 ComputerWorld I/S Brand Preference Study

The latest **ComputerWorld** Preference Studies show dBASE outranks the competition in 12 out of 14 categories.

Easy Label Designer includes formats for mailing labels, name badges, even Rolodex cards. You name it—you're only a few keystrokes or mouse clicks away from having it on your desk.

The world's #1 database keeps getting better

New dBASE IV comes complete with pull-down menus and mouse support, so you're never more than a click away from your data.

IQ!™ technology, dBASE's exclusive Index Query optimizer, finds the fastest way to get the answers you want from your database—automatically—even in the most complex network environments. Our relational Query By Example lets you manipulate your

data quickly and easily. All you have to do is select the fields you want, and *presto*—instant results!

Fast new auto-install program practically installs dBASE by itself. It has never been easier to get started with a professional database.

Sophisticated tools for power developers

Power developers will like dBASE IV's 40 work areas, IBM® SAA-compliant SQL, plus many new functions and commands. The Template Language is now included free. We've enhanced BLANK support. And dBASE's automatically generated code can be com-

bined with your own custom programming for unmatched speed and flexibility in creating new applications.

Create applications easily

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B O R L A N D

Software Craftsmanship

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CIRCLE 285 ON READER SERVICE CARD

New & Improved

NEW

ZyIMAGE: Document Imaging And Retrieval System

ZyLAB, a Division of Information Dimensions, has unveiled ZyIMAGE, a Windows-based document imaging and retrieval system that integrates **Calera Recognition Systems'** WordScan OCR (optical character recognition) system with ZyLAB's ZyINDEX 5.0 text-retrieval software. ZyIMAGE provides scanning, image management, OCR, and full text-searching capabilities and structured data retrieval.

In addition to indexing and storing recognized text, the system's document imaging and retrieval capabilities include TIFF Group IV image compression, editing, key field tagging, commenting, blank page separation for batch scanning, and saving text to a hard disk while simultaneously storing linked images to an optical disk.

• List price: ZyIMAGE, \$795 (requires Calera's WordScan, \$295). ZyLAB, a Division of Information Dimensions Inc., 100 Lexington Dr., Buffalo Grove, IL 60089; 800-544-6339, 708-459-8000; fax, 708-459-8054.

Circle 405 on reader service card

IMPROVED

ChipSoft Makes Your Taxes Less Taxing

ChipSoft is now shipping HeadStart versions of TurboTax for DOS, TurboTax for Windows, and a new program, Personal Tax Planner, for calculating income on a quarterly basis to ensure compliance with the new estimated payment rules resulting from the Tax Extension Act of 1991 and the Unemployment Compensation Bill. The HeadStart versions (which do not include all 1992 forms) can be used to start entering or transferring existing tax information, such as expenses and depreciation, into TurboTax worksheets, and for end-of-year tax planning. HeadStart users receive the final version free of charge in early 1993, when all 1992 IRS forms have been published.

The 1992 version of TurboTax includes a number of new features, including EasyStepR, a tax preparation system that guides you step-by-step through the entire process. The interview (questions that elicit all the necessary information for each individual tax return) is enhanced, with many specific questions requiring only a "yes" or "no" answer. A new progress bar indicates how much you've accomplished on tax preparation tasks. The Quicken import feature has also been simplified.

BRIEFS

SOFTWARE

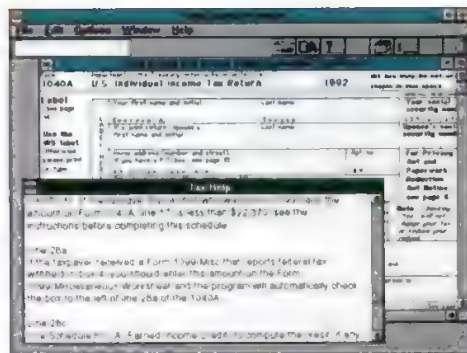
and style checker, featuring a new Grammar Equalizer that lets you visually adjust the number and type of writing errors examined by the program. Also new to the program is inflection checking, a customizable grammar checking engine, and integrated spell-checking, allowing you to check grammar, style, and spelling in a single pass. 800-992-0244, 317-573-2500.

Rational Data Systems has unveiled VoiceOver (\$129) software that allows WordPerfect 5.1 for DOS users to annotate documents with comments. VoiceOver lets you record sounds that are then stored in WordPerfect. Voice annotations appear on the screen as standard WordPerfect comments and include each annotation's author, date, time of creation, and length. 415-499-3354; fax 415-499-8115.

Robinson Development is shipping GOMacro! (\$24.95), a macro utility for WordPerfect 5.0 and 5.1. GOMacro! displays a menu of macros and their descriptions. Users can run or d/edit macros from the menu. Macros can be sorted by name or description. 713-961-4218.

SPSS Inc. is shipping the Advanced Statistics module (\$495) for its Windows-based product, SPSS for Windows, Release 5.0. The new module adds logistic regression, loglinear analysis, Cox regression, MANOVA, Kaplan-Meier, and actuarial survival analysis to the base software. Users of SPSS for Windows 5.0 receive the add-on module when purchasing the 5.01 upgrade. 800-543-2185.

WordStar International is shipping The American Heritage Dictionary Second College Edition (\$129), a 303,000-word electronic dictionary that also includes the complete 500,000-word Roget's II Electronic Thesaurus. The new version includes a reverse search feature called WordHunter, as well as brief descriptions of over 3,000 two-year and four-year colleges; over 1,500 commonly used abbreviations; geographical entries; biographical entries; and Indo-European roots. 800-523-3520.



TurboTax for Windows simplifies tax preparation.

• List price: TurboTax for DOS, \$79.95; TurboTax for Windows, \$79.95; Personal Tax Planner for DOS, \$49.95; Personal Tax Planner for Windows, \$49.95. ChipSoft Inc., 6330 Nancy Ridge Dr., #103, San Diego, CA 92121; 619-453-8722.

Circle 410 on reader service card

NEW

Best Data Shows Off 14.4 PCMCIA Fax/Modem

Best Data Products has unveiled its credit-card-size Smart One 1442 PCMCIA, a 14,400-bits-per-second send/receive fax modem that operates in any PCMCIA Version 2.0 slot. Designed for use in notebook PCs, the Smart one 1442 PCMCIA features built-in CCITT V.42bis and MNP data compression, and V.32bis error correction for effective throughput rates of up to 57,600 bps, according to the company.

The unit offers a number of software features, such as time-scheduled transmission (allowing you to send faxes unattended); broadcast faxing; and the ability to view, rotate, and print incoming faxes. Trellis Coded Modulation and error correction using Viterbi Decoding improves transmissions over poor lines.

• List price: Smart One 1442 PCMCIA, \$599. Best Data Products Inc., 9304 Deering Ave., Chatsworth, CA 91311; 800-632-2378, 818-773-9600; fax 818-773-9619.

Circle 408 on reader service card

NEW

BusinessWorks Accounting System Now Does Windows

After nearly two years in development, **Manzanita Software Systems** has unveiled BusinessWorks Accounting System for Windows, a multimodule accounting package that has all the features of the DOS version,

New & Improved

along with full DOS file compatibility. The system will consist of several modules, three of which—general ledger, accounts payable, and system manager—are available now.

The system manager module supports single users, up to 48 simultaneous users, and accommodates up to 100 companies. The general ledger module provides 17 industry-specific sample charts of accounts that can be modified. It also supports up to 9,999 accounts and 999,900 departmental accounts. The accounts payable module supports an unlimited number of vendors, up to 12 characters in a vendor ID, and an unlimited number of invoices per check.

• **List price:** *BusinessWorks Accounting System for Windows: all modules \$295, except System Manager, \$95, and Job Cost, \$395. Manzanita Software Systems, 2130 Professional Dr., #230, Roseville, CA 95661. 800-447-5700, 916-781-3880 (also fax number).*

Circle 411 on reader service card

IMPROVED

WideAngle 3.0 Gains "TV-Like" Interface, Drag-and-Drop

Attitash Software has unveiled WideAngle. Version 3.0, an upgrade of its Windows desktop expansion and management utility. This version has a new interface based on a TV remote-control metaphor. The program's default screen displays nine buttons in a square grid. Each button represents a Windows or DOS application, and clicking on a button launches the application.

WideAngle 3.0 offers three display formats.



WideAngle 3.0's Channel Map display.

The Channel Map is a full-screen display showing the current channel and the applications assigned to it. The Channel Tuner is a smaller version of Channel Map that floats on-screen. Micro Tuner is smaller still, similar to the Power Ike found in earlier versions of WideAngle.

• **List price:** *WideAngle 3.0, \$49.95, Attitash Software Inc., 20 Trafalgar Sq., Nashua, NH 03063; 603-882-4809; fax, 603-882-4936.*

Circle 415 on reader service card

BRIEFS

SOFTWARE

Avalan Technology is shipping Remotely Possible/Dial, Version 2.1 (\$199), featuring support for up to 16 million colors, a new user interface that includes file transfer status meters, and a user-defined inactivity timer. Remotely Possible/Dial also supports all Windows video resolutions and Windows accelerator cards. 800-441-2281, 508-429-6482; fax, 508-429-3179.

Bitstream is shipping Li'l Bits novelty font packs, which range in price from \$19.95 to \$29.95. The selections include: The Star Trek Font Pack, The Flintstones Font Pack, and The Winter Holiday Font Pack. 617-497-6222.

On The Go Software is shipping Expense It!, Version 2.1 (\$129.99), its expense report generating software program. The new version has an itinerary module that allows users to determine the duration of their reports. Expense It! 2.1 also has a new landscape report style, new code windows to simplify adding and editing expenses, and a lower memory requirement of less than 400K. 714-489-4050, fax 714-489-1797.

Optimum Electronics' PC PASSKey security software monitors all system activity to ensure only authorized use of PC resources. The system offers features ranging from user IDs and passwords to a coded access key that must be read by the system. PC PASSKey functions at the DOS boot level, and under Windows 3.0 and 3.1. It offers boot protection, hard disk encryption, floppy disk encryption, password protection of directories, virus protection, and system monitoring. Pricing starts at \$300 for the basic configuration. 203-239-6098; fax, 203-234-9324.

The Triangle Software Division of Datawatch Corp. is shipping Virex for the PC, Version 2.3, offering over 500 new explicit virus detectors, bringing the total number of known viruses detected to over 1,250. The new version can also send virus alerts over Novell NetWare networks. 919-490-1277; fax, 919-490-6672.

IMPROVED

Asymetrix Updates MediaBlitz! And Instant DataBase

Asymetrix is shipping MediaBlitz!, Version 1.5, its multimedia utility, and Instant Database, Version 2.0, its database for Windows. MediaBlitz! 1.5 now features server support for OLE (Object Linking and Embedding), which means you can play a MediaBlitz! score in any application that supports OLE.

Instant Database Version 2.0, now includes support for mailing labels, multimedia capabilities, new forms, and an auto-dialer. You can add animation, graphics, MediaBlitz! scores, .WAV audio, MIDI audio, and digital video files to the record fields. Some of the version's new forms include a Rolodex, a mailing label form, a research catalog, home and business inventories, a credit card catalog, a small-business personnel database, a travel log, and a media-clip catalog.

• **List price:** *MediaBlitz!, Version 1.5, \$95; upgrade from previous version, \$25. Instant Database, Version 2.0, \$95; upgrade from previous version, \$25. Asymetrix, 110 110th Ave. NE, #717, Bellevue, WA 98004; 800-448-6543, 206-462-0501; fax, 206-454-0672.*

Circle 413 on reader service card

IMPROVED

Action 2.5 Adds Support for Analog and Digital Video

Macromedia has unveiled Macromedia Action! 2.5 for Windows, the latest version of its multimedia presentation tool, which now incorporates digital video. Action 2.5 supports Microsoft's Video for Windows (AVI), Apple's QuickTime for Windows, Intel's DVI, MediaVision's ProMovie Spectrum card, Creative Labs' Video Blaster card (analog and digital video), and Autodesk's .FLI and .FLC animation files.

Macromedia Action! 2.5 includes an updated player application, which you can distribute free of charge, that allows any Windows-based PC to play back an Action! presentation—even if the program is not installed. The new version of the player also supports the new video technologies.

• **List price:** *Macromedia Action! 2.5 for Windows, \$495; free upgrade to registered owners of Action! 2.0 for Windows until January 31, 1993; \$79 upgrade to registered owners of Action! 1.0 for Windows until January 31, 1993. Macromedia, 600 Townsend St., San Francisco, CA 94103; 800-288-4797; fax, 415-626-0554.*

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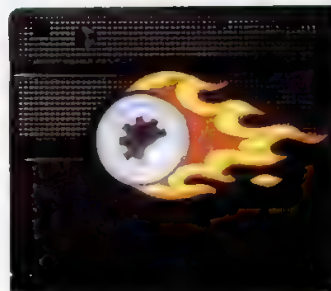
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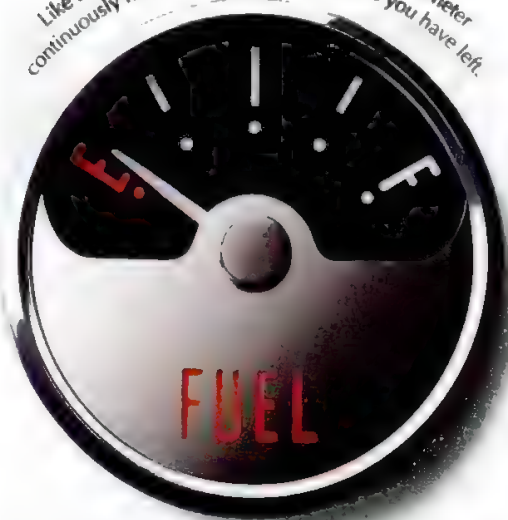


Our data compression technology has a proven track record. In fact, over four million people use it every day. From Fortune 500 companies to home offices.

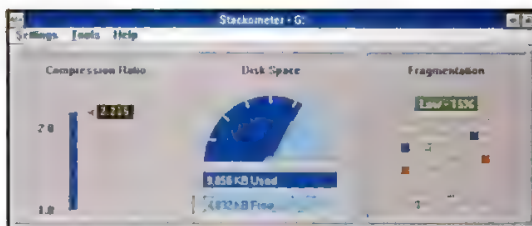


On all stacked drives, you can set double passwords, one for read/write and one for read-only access. With read/write, users who don't know your password have no access to your data. With read-only, they can see the data but are unable to alter it.

Like a gas gauge for your computer, the Stackometer continuously monitors the amount of space you have left.



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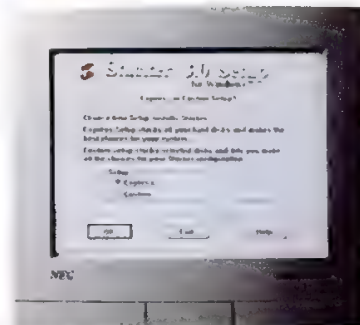
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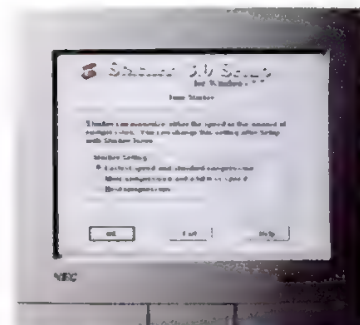
Stacker is so advanced, it even works in places where it doesn't exist. Because once your removable disk is stacked, you can read from or write to it anywhere, even on a PC that doesn't have Stacker.



The only place where we might run out of room is on our trophy shelf. In less than two years, we've won every major award in the industry. Including PC Magazine's Editors' Choice and Windows Magazine's WIN 100.



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In explaining what our new software does we ran out of space.

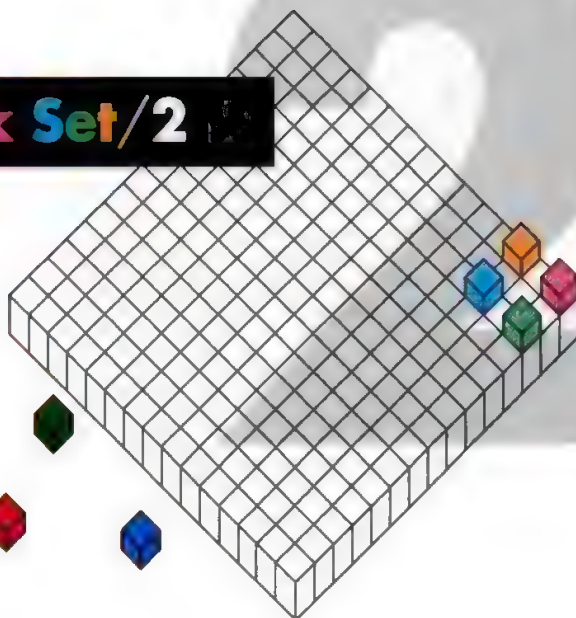
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REVIEWS OF THE LATEST BOOKS FOR THE PC USER

Edited by Carol Levin

Gates Biography Analyzes The Man Behind Microsoft

BY DON WILLMOTT

Face it. When you become the richest person in America, someone's going to write a book about you, whether you like it or not.

Microsoft chairman Bill Gates may not have liked it, but he did sit for 20 hours of interviews with computer journalists Stephen Manes and Paul Andrews as they wrote an impressively detailed chronicle of the man and his company.



The result is *Gates*, an unauthorized biography with just enough input from Gates to make it more informed—and more interesting—than other books about him. But despite Gates's contribution, the book is independent and scrupulously documented.

By now, everyone knows

something about Gates: his overachieving youth; his company's humble beginnings as a BASIC vendor in Albuquerque; his lucky DOS deal with IBM; and his brawls with Lotus, Borland, and anyone else who stood in his way.

Manes and Andrews tell all these stories in full, with anecdotes about Gates's famously confrontational managerial style, which has made him the most admired, feared, and loathed man in the software business.

If one theme emerges, it's that speed and success go together. The book outlines the speed of Microsoft's growth, the speed of its software development (and the problems that occur when it slows down), even the speed of Gates's Porsches. Among the most telling factoids is that he prefers baths, where

■ Gates On Smart Guyism

"Gates was taken with *The Selfish Gene* by Oxford zoologist Richard Dawkins. Trenchantly Darwinistic, the book proposed the notion of *memes*—'tunes, ideas, catch phrases, clothes fashions, ways of making pots or of building arches'—that get replicated and elaborated to survive through the ages simply because they are better than run-of-the-mill thinking. It was survival of the smartest, Smart Guyism triumphant—as Gates enthused, 'the idea of ideas, that the human mind is sort of the host for those ideas and there's a competition for which ideas work well, are effective, and so those ideas contain within them the seeds that allow them to be passed along to other humans and therefore survive.'"—*Gates*, page 390.

he can "multitask," to showers. Gates is clearly a busy man in a big hurry.

But where to? Like others who have written about Gates, Manes and Andrews don't get to the bottom of Gates's motivation. It's easy to describe *what* Gates has done (the authors do an outstanding job), far harder to explain *why* he's done it, what inner force has driven him to try so hard for so long.

It's been a busy 15 years for the man sitting atop the Forbes 400 list. Will he stop to enjoy the

view? The authors don't think so. Gates has a lot to do before computers sit on every desk and in every home, all running Microsoft software.

Meanwhile, if you're driving in Seattle and a very nice car blows by on your right, don't worry. It's probably just Gates heading back to the office.

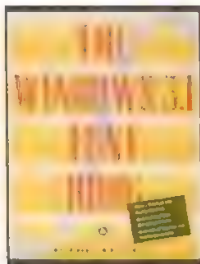
• *Gates*, by Stephen Manes and Paul Andrews, \$25. Doubleday, 666 Fifth Ave., New York, NY 10103; 800-223-6834, 212-765-6500. ISBN: 0-385-42075-7.

Circle 456 on reader service card

The Little Literacy Guide to Windows Fonts

BY EDWARD MENDELSON

If you weren't convinced that the arrival of TrueType in Windows 3.1 makes fonts easy to use, consider the fact that *The Windows 3.1 Font Book* is one of the thinnest computer books ever published. David Angell and Brent Heslop didn't need to write hundreds of pages of problem-



solving advice, but were able to write a compact, elegant guide to managing Windows fonts.

The book opens with a guide to font formats and styles, then walks you through font management using the Windows Control Panel and Adobe Type Manager. It even explains how to copy font files and create a batch file for font downloading. Charts of

Windows symbol sets, a survey of font utilities, and low-priced fonts samples fill out the book.

In its coverage of the steps you take to install and use fonts, the book is strikingly accurate. It sometimes misstates the steps that Windows performs in the background, but this won't affect the way you work.

The authors cover only TrueType fonts and the PostScript Type 1 fonts used by ATM—the only fonts you'll probably use. But if you work with fonts in Intellifont, Speedo, or LaserJet bitmap formats, you're on your own.

The Windows 3.1 Font Book is the first and only practical

guide to fonts that isn't bloated with irrelevant and outdated information. Its lucid organization and abundant illustrations make it impossible to go wrong when you use the more obscure options built into Windows' font control menus. If you want to move beyond the 13 TrueType fonts built into Windows, look here first for advice on where to get more fonts and on what to do with them. □

• *The Windows 3.1 Font Book*, by David Angell and Brent Heslop, \$12.95. Peachpit Press, 2414 Sixth St., Berkeley, CA 94710; 800-283-9444. ISBN: 1-56609-005-9.

Circle 457 on reader service card



Increased 386 Perform

AMD's 3-Volt 386 Microprocessors Deliver The Longest Battery Life For Portable Computing.

The power struggle continues. While you can get a 386 microprocessor that goes fast, you'll still burn through a battery charge in a hurry. Low-voltage 386 CPUs from AMD are the answer—the Am386™SXLV and Am386DXLV microprocessors.

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run on 3 volts. And they automatically slip into a static "sleep" mode to save power whenever the processor is idle. So users depend less on recharge units—and get the longest operational battery life.

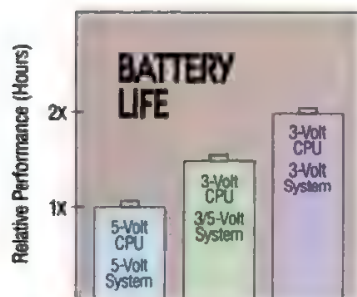
Both Am386 CPUs were designed to fit as comfortably in your budget as they do your portable computers. But you won't compromise on performance because the Am386SXLV and Am386DXLV 3-volt microprocessors both run at 25MHz. So



The 25MHz DXLV and the 25MHz SXLV are available in PQFP packaging.



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needs covered with our 3-volt EPROMs. And now that the industry at large has welcomed low-voltage portable computing, you'll find the rest of your components equally easy to come by.

they're plenty powerful for running Windows.™

Now there's nothing stopping you from charging forth with more efficient 3-volt laptops, notebooks, and palmtops. AMD also has your memory

For more information on low-voltage 386 microprocessors and support logic, call **1-800-222-9323** and ask for Literature Pack 15F. And become the current leader in portable computing.

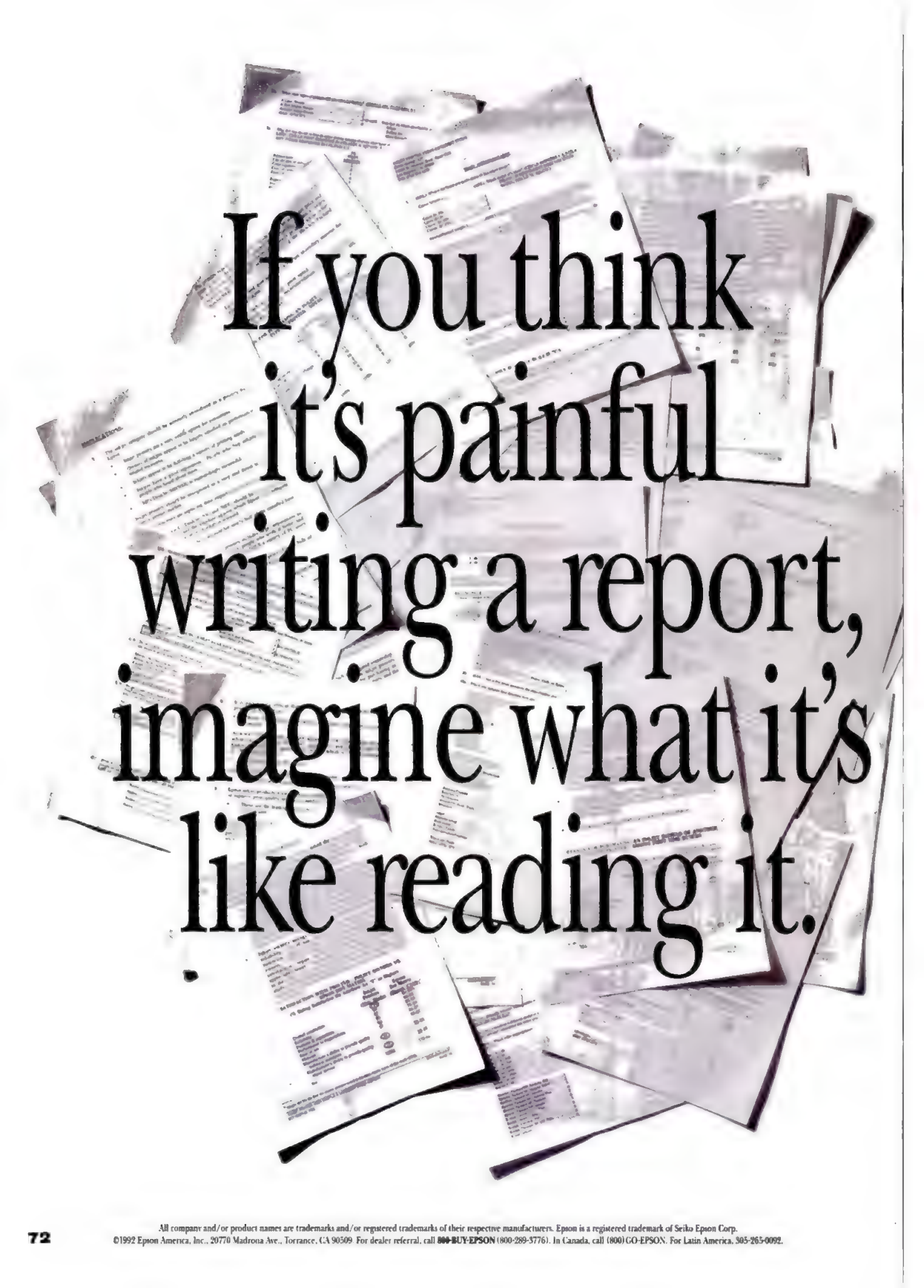


Advanced Micro Devices

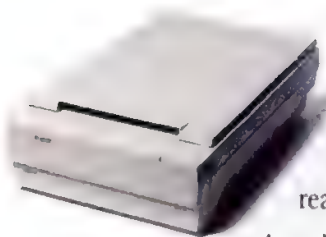
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If you think
it's painful
writing a report,
imagine what it's
like reading it.



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A tool that easily could've been named the Epson "Add A Picture and Some Interest To Your Documents" Machine.

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Epson also offers handy add-ons, like a transparency unit for scanning slides, or an auto-document feeder to cut down on all of that time-consuming lid lifting. And, as always, we give a one year warranty. Not that you'll need it given the way we make things around here, but just so you know we're there if you need us.

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Quarterly Report

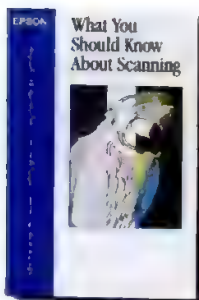
Quarterly Report
The first quarter of the fiscal year has been a very successful one for the company. The sales have increased by 15% compared to the same period last year. The profit margin has also improved, thanks to the new product line. The management team is confident about the future prospects of the company.

Before.

Quarterly Report

Quarterly Report
The first quarter of the fiscal year has been a very successful one for the company. The sales have increased by 15% compared to the same period last year. The profit margin has also improved, thanks to the new product line. The management team is confident about the future prospects of the company.

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CIRCLE 139 ON READER SERVICE CARD

Toolkits

REVIEWS OF THE LATEST TOOLS FOR THE PC PROGRAMMER

Edited by Trudy Neubaus

Ease the Pain of Graphics Programming with PCX Toolkit for Windows

BY BOB FLANDERS

No matter how you measure it, writing programs that use graphics is a difficult endeavor. But Genus Microprogramming's PCX Toolkit for Windows promises to ease the burden. And it delivers. At \$249, the PCX Toolkit for Windows provides 36 functions that let you load, display, scale, and save graphics from within a Windows application without worrying about the details of a graphics file format and memory layout.

The PCX Toolkit's philosophy is simple: Graphics are always stored on-disk as .PCX files and, when read into memory, converted to either a Device Independent Bitmap (DIB) or a Device Dependent Bitmap (DDB). Once in memory, the DIBs or DDBs may then be manipulated with either PCX Toolkit functions or Windows SDK (Software Development Kit) graphics functions.

To implement this philosophy, the PCX Toolkit is divided into two sections. The first section, the PCX functions, retrieve, store, and manipulate .PCX files. Using a single function call, a .PCX file can be opened and retrieved into a DIB or DDB. Similarly, functions are provided to convert and store the contents of a DIB or DDB to a .PCX file. For example, to write a DIB out as a .PCX file, you would use the function `pcxDIBFile()`.

The second section, the GX Kernel, provides functions to

move and manipulate DIBs and DDBs. Most of these functions convert a graphic from one format to another, read or write graphics from or to the Clipboard, and scale and display graphics. For example, to display a DIB, simply call `gxDisplay()`.

Most of the toolkit's function names adhere to a simple naming convention: A prefix of `pcx` or `gx` indicates the section of the toolkit, and the next two words indicate how data is transferred. The function `gxBitmapDIB()`, for instance, copies and converts a DDB into a DIB. In functions where no transfer takes place, the function name describes the process performed, as in `pcxGetVersion()`, which retrieves the toolkit's version.

The return codes, however, deviate from the `pcx/gx` convention. PCX functions return GX return codes. For example, `pcxFileDIB()` returns `gxERR_NOTFOUND` if the file does not exist. This is a small but annoying inconsistency.

One unusual feature of the toolkit is that it lets you include one or more PCX images in your application's executable file as resources. Although this can cause an executable file to get very large (depending on the size of the .PCX file), it can help cut down on the number of files that you must distribute with an application.

The PCX Toolkit for Windows supports several compilers: Microsoft C 5.1 through 7.0, QuickC for Windows, Turbo C++ for Windows, Borland C++, Turbo Pascal for Windows, and Visual Basic. Each of the example programs is provided in C, Pascal, and Basic. Although Genus wrote the C examples under Microsoft C 6.0, they compiled flawlessly under Borland C++ once the project file was set up as directed in the documentation.

The 150-page manual is generally well written, documenting each function with an example in each of the supported languages. This not only shows how the functions work, but also serves as a "rosetta stone," showing how to write the same function in different languages.

There are a couple of areas in which the manual could be better. For example, it documents most function return values with the phrase "returns a success or error code," omitting a listing of which errors may be returned by the function. You must sift through the various return codes trying to glean which code might apply to a particular function. Another omission left the `gxClipboardDIB()` function completely undocumented. Genus was unaware of this problem, but noted that the include file shows the arguments for the function.

When installed for all possible languages with all the examples, the PCX Toolkit for Windows takes a little over 1MB of disk space. The installation program asks you what to install and where to install it. After installation, you must either modify your DOS path to include

the directory containing the DLLs, or copy the DLLs to a directory on your path.

The toolkit includes a utility that lets you load, view, scale, and save .PCX files. This utility can also capture all or a portion of the Windows display as a graphic. The toolkit comes with the complete source for the utility in C, Pascal, and Basic.

PCX Toolkit uses two DLLs that contain the executable code. By using DLLs, the toolkit helps keep down the size of the executable files. However, when writing commercial software, you must also remember to include the DLLs on the distribution disk, and install them in a directory referenced by the DOS environment path variable. The DLLs use about 17K of disk space.

You can distribute the DLLs for free, and no royalty is imposed on applications using the toolkit. But you must make separate arrangements with Genus before distributing the source code of your applications, since it could serve as documentation for functions contained in the toolkit.

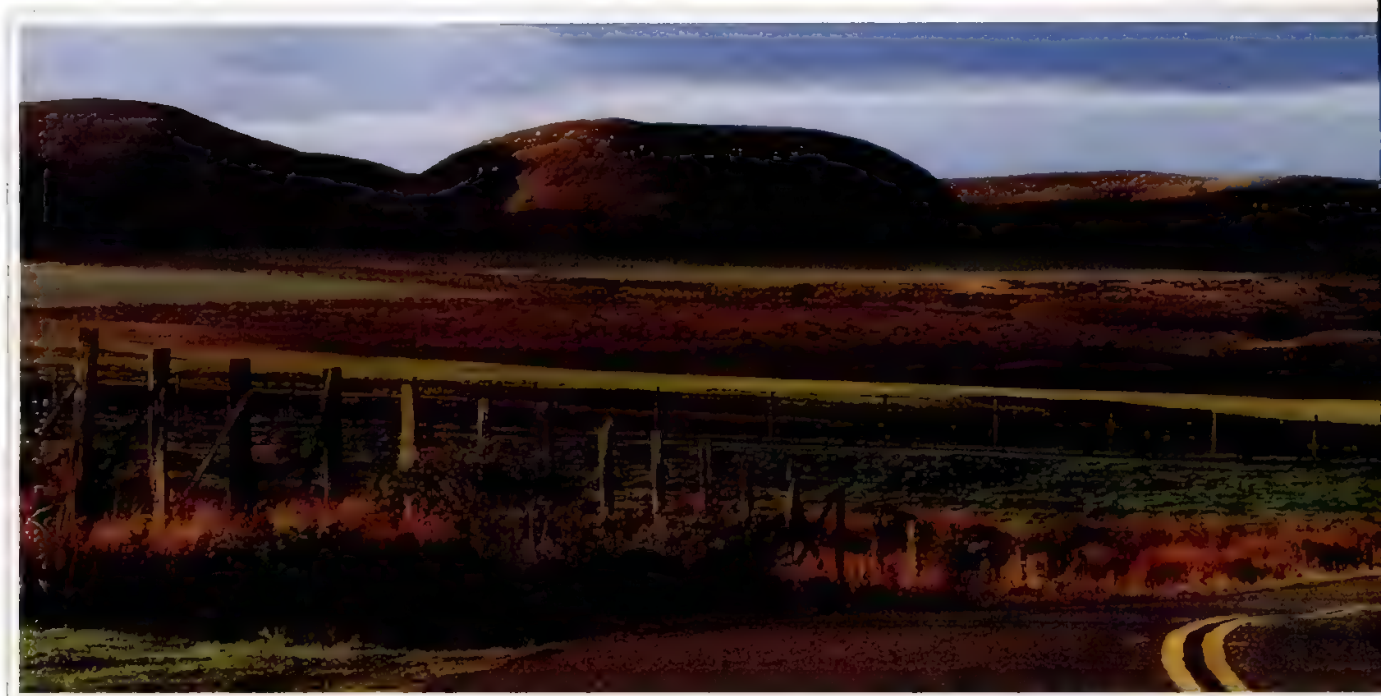
In spite of a few documentation errors, and some very minor inconsistencies, PCX Toolkit for Windows can help you add graphics to an application quickly and efficiently. And you won't be tempted to use graphic language when doing so. □

• PCX Toolkit for Windows, Version 1.0

List price: \$249 (\$599 with source). Requires: Windows 3.x and Microsoft C 5.1 or later, QuickC for Windows, Borland C++ 3.0 or later, Turbo C++ for Windows, Turbo Pascal for Windows, or Visual Basic. Genus Microprogramming, 2900 Wilcrest, #145, Houston, TX 77042-3355; 800-227-0918. Circle 451 on reader service card



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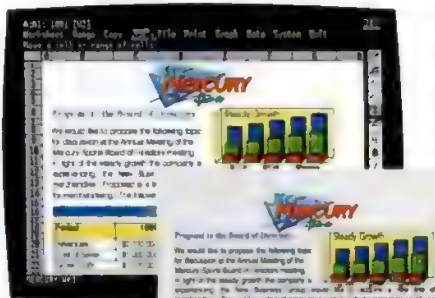
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Michael J. Miller

Open Your Eyes to Visual Databases

It's not every day that database software makes news. Big splashes in this traditionally sedate market, the slowest growing of the major software categories, are rare. That may all be changing thanks to Microsoft Access and Borland's Paradox

for Windows. These two Windows-based programs take advantage of the graphical environment to allow end users and database developers to create sophisticated applications with very little programming.

In the last issue, I talked about how drag-and-drop computing was making it easier for typical computer users to do things that previously would have required a lot of expertise, or at least a lot of programming. Nowhere are the benefits of graphical computing more welcome than in the area of relational databases.

Programmable relational databases have come a long way from the days of dBASE II, with its minimalist dot-prompt user interface. Nowadays, even character-based databases have improved user interfaces that access sophisticated features, and every major package has a main menu, pull-down menus, and mouse support. And instead of programming a form, now you can draw it using graphical tools.

Both Windows packages go much further by implementing the icons, visual clues, and drag-and-drop possibilities of the graphical environment. And they offer all this without sacrificing the power developers need: programmability, connectivity to SQL databases, and referential integrity. In fact, they make the once complicated and tedious jobs of creating good looking forms and reports easy.

MICROSOFT ACCESS

Released in November, Microsoft Access is designed to make sophisticated database programming available to a broad audience. It includes a variation of BASIC, but the goal is to let you create complex applications *without* programming.

The tables, queries, forms, reports, macros, and modules (programs) that comprise your database are all listed in groups in an overall database win-

dow or *container*, and you use the mouse to easily move through it. To create a new table, you select the table option, click on a new button, then enter the field name, data type, and description for each field. You can then view your table in a datasheet that looks like a spreadsheet. This is convenient, but it isn't a big departure from what we're used to.

Where Access really starts to take advantage of the graphical possibilities is in form and report design. A Form Wizard icon gives you a variety of choices for creating a form based on an existing table or query. Choose a single-column, tabular, graph, or subform style; the fields you want displayed; and a basic look. Wizards make it simple to create a variety of forms.

The program's design view is where you modify the position and look of various elements of your form. Add new elements, such as a check box or a list form, by just dragging them from a toolbox onto the form, choosing the field name, and entering information. You can also add validation rules and default values.

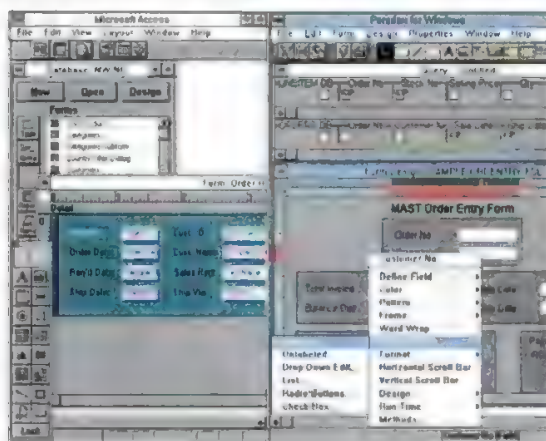
To create a query, you select the existing tables or queries you want to work on, show the relationships between those tables, then drag the field names you want into the program's query-by-example grid. Then

you can enter criteria, and Access shows you what it calls a *dynaset*—the current data that matches the query, which you can view in a datasheet. Of course, you can also design a form or report to view that data.

In short, Access takes full advantage of graphical options, from dragging form elements out of a toolbox to dragging field names into a QBE form, and it offers its own contributions, such as the built-in Form Wizards, as well.

PARADOX FOR WINDOWS

Borland is using the graphical interface in rather dif-



Microsoft Access and Borland's Paradox for Windows are redefining the market for database software.

Michael J. Miller

ferent ways in Paradox for Windows, due out shortly. Paradox seems aimed at a slightly higher-end user and has some more sophisticated tools than Access, but Paradox, too, makes it easy for someone with little database experience to get started.

Perhaps the biggest difference in Paradox is its use of Property Inspectors, which let you click the right mouse button on objects in a table, form, or report and set the options associated with that object. This allows you to make complicated changes to forms or reports very easily.

Even for novices, Paradox is straightforward. Creating a table is simply a matter of listing field names, types, sizes, and descriptions. You can create new tables in many file formats, including native format, Paradox 3.5, dBASE III Plus, and dBASE IV, and use the tables interchangeably. If you're starting from scratch, you'll want to use the Paradox for Windows format since it supports binary and OLE fields, although I wish it had a logical (yes/no) field type.

In Paradox, you can enter data directly

into a table or into a form. I particularly like the option of just clicking a single icon from a table view to create a Quick Form.

Paradox also gives you the tools to create more complicated forms or reports rather simply. In a data model window, you choose the tables to work on and the relationship between them. You can link tables visually and define some fairly complex links. A design layout screen then gives you all sorts of basic options. You can choose a single-record, tabular, or multiple record form; define field or columnar displays of data; define whether or not you want field labels; and specify the page layout.

Of course, you can move fields around on the page, but there are many more options when you click the right mouse button to bring up the Property Inspector. You can change color, pattern, alignment, and font, as well as verify that a field is labeled, unlabeled, a list box, drop-down edit box, or a check box. Reports also offer an assortment of useful options, such as squeezing out space between the fields.

Under DOS, Paradox always stood out for its real benefits of query-by-example. Under Windows, this has evolved into a more graphical process, with check boxes indicating whether you want to include a

field. You can add tables very quickly, link them together visually, and set sophisticated criteria. You can also save queries and manipulate the results in an answer table.

This interface for creating queries (which also shows up in Borland's Quattro Pro for Windows as the Database Desktop) proves how visual programming can really make everyday tasks simpler.

THE DATABASE DECISION

Which database is right for you? Access is somewhat simpler than Paradox. It takes people who previously would consider only a nonprogrammable database, and it gives them much more power along with a BASIC-like programming language. Paradox will probably be better received by traditional database developers because of its more sophisticated tools. It also makes complicated tasks much easier than any character-based database I've seen.

Not every database developer will want to move to a graphical system. Character-based systems tend to be faster, run on smaller systems, and be known quantities. But for people who want to create sophisticated, good-looking programs with a minimum of programming, the graphical feel really makes a difference. □

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It makes any other solution seem totally primitive.



MEDIA VISION



Bill Machrone

We Won the War—Now What?

I went to my first user group meeting in 1976. I hadn't yet selected a personal computer system and, considering that I would have to build it myself, it was not a decision to take lightly. I vastly preferred the idea of talking to users to

that of listening to manufacturers' promises.

At the meeting, I was amazed at everyone's competence and knowledge; I felt I would never close the gap between us. I was also amazed at how willing everyone was to help everyone else. People brought their systems to the meeting—in those days, a physical feat and labor of love, since the system unit, drives, and monitor were all separate, bulky packages, none weighing less than 30 pounds. People shared experiences, software they'd written, and, most of all, knowledge. The sharing was great and heartfelt, but at its core, the user group meeting was a separatist movement: We were there to celebrate how different we were from everyone else.

The revolution came and we prevailed. The future is now firmly in the hands of the microprocessor-literate. With that power comes responsibility. We technologists have long claimed that computers would make the world a better place. We've shattered the myth of computers as instruments of totalitarianism. Instead, desktop communication, publishing, and database power have been tools in the myth's dismantling. That's a good start. It's one thing to change the world order; it's another to improve the quality of lives around us.

We've spent enough time celebrating our difference; now it's time to celebrate our similarity. We've worked hard to master computer technology, now we can reach a hand out to others who can benefit from it as well. It's a challenging role for user groups, one that will hallmark their success in this decade.

A LITTLE INCENTIVE

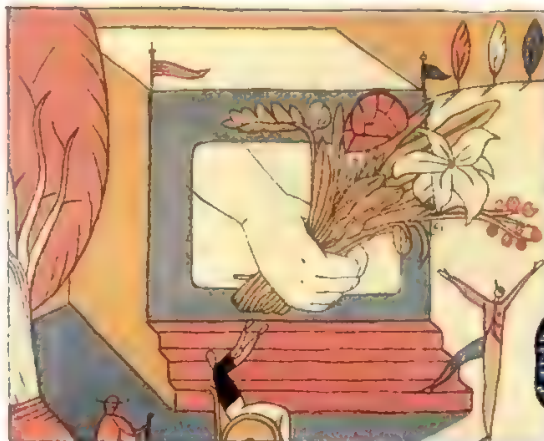
We believe in the concept of PC user groups helping others so much that we at Ziff-Davis Publishing have worked with the Association of PC User Groups to create the

REACH Awards (for Recognizing Exceptional Achievement in Community Help). The awards focus on five areas: Education and Training, Social Welfare and Improvement, Medicine and Health, Civic and Cultural Affairs, and Environment and Conservation. We're collecting nominations from user groups everywhere for projects in these categories. The criteria are fourfold: the degree of involvement and scope of the project, the impact of the project measured by the actual degree of benefit to the recipients, the use of computer technology, and the willingness to share information with others wanting to do similar projects. REACH will make a cash award of \$15,000 in each category, with the prize to be applied to the winning project.

During the APCUG meeting at Fall Comdex, I saw an inspiring array of projects already in the works. One of the most uplifting—and illustrative of the enormous power of the PC—was the Cincinnati User Group's efforts on behalf of a woman with ALS, or Lou Gehrig's disease. Almost completely paralyzed, the woman, a mother of teenagers, had not been able to speak for the past six years. When sitting up, she could control the position of her head, turning it a bit one way or

another. The project team attached a low-powered laser to her glasses, then built an optical keyboard: large letters on a sheet of plastic with optical sensors behind them. She aims her laser at each letter and pauses on the letter she wants. A menu system takes her quickly to the software she uses, primarily a word processor.

This woman, who was unable to express a preference, a thought, a word of affection or advice to her husband and children, can now communicate freely, if laboriously. When her family comes home each day, a batch of printed



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Bill Machrone

messages awaits them. She's still paralyzed, but her mind is no longer imprisoned in an unwilling body. I saw a video of her using the device at the meeting where we announced the REACH Awards; it was deeply moving. What would you or I have to say after six years of enforced silence?

Other than the optical keyboard, her computer is standard in every way. The user group has placed 17 machines so far.

The possibilities are obvious and endless. Home control hardware and software can give these people the ability to control their environment once again. Everything from setting the thermostat, to changing the television channel, to reading books on-screen is suddenly within reach.

SMALLER VICTORIES

Not every case of computers helping people has to be as dramatic as a rescue from the abyss of paralysis and isolation. Think of a how a food bank could use a wheezing old 286 to do basic inventory, accounting, mailing lists, and distribution logistics. Consider how the ability to use a keyboard is one of the potential separators between the haves and the have-nots. Can you help children cross that gap? Your old machine in the school library might be one of life's signposts that points a child down the road to intellectual growth and a good job. Would your company let you run a computer club for an hour or two a week at a local school?

Any letter-quality printer is a powerful weapon in nonprofit organizations' unceasing quest for funds, support, and volunteers. Almost every kind of equipment, though, can have a use: microcomputers, minicomputers, software, peripherals, even old office equipment. You can donate your obsolete equipment through the National Cristina Foundation, at 800-274-7846. Its slogan is: "Helping people with differing abilities lead more productive lives."

If you'd like to find out more about the REACH Awards or receive a nomination form, write to APCUG, 1730 M St. NW, #700, Washington, D.C. 20036. You might want to inquire about the more than 300 worldwide user groups that represent more than 300,000 users. You can also download a copy of the nomination form from APCUG's GLOBALNET at 408-439-9367 (N81). The first annual REACH Awards will be presented in Atlanta at Spring Comdex in May, 1993.

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(9/92) says our

DOS version is "as

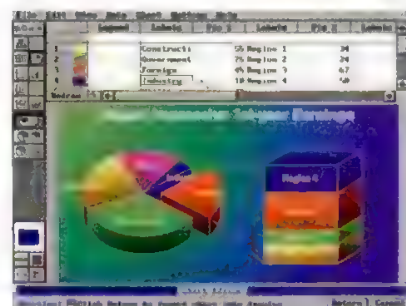
much like Windows as DOS gets. Even industry leader Harvard Graphics for DOS doesn't look as graphical or as slick." *PC Computing* (12/92) raves that Presentations "outdoes most Windows programs not only in the

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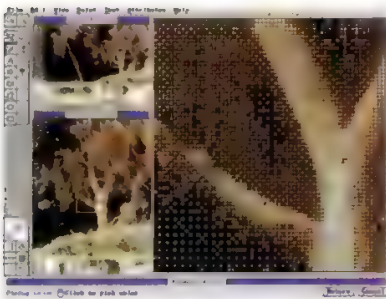


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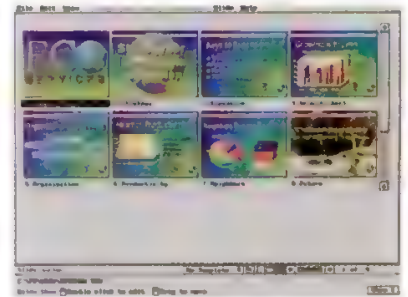
is the only presentation program for DOS that includes paint tools. And the only one that gives you the ability to convert

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John C. Dvorak

Suckered Again by Trickery

It used to be called integrated software. Now it's called the software suite. It used to be unpopular and ridiculed. Now it's the latest way to market software and make a lot of money. What has changed? Nothing but the name, that's what.

Software suite software is hot. It's the rage. I paid no attention to this trend until Fred Gibbons, founder of Software Publishing Corp., makers of an excellent standalone presentation graphics program, Harvard Graphics, was describing the emerging "best of breed" versus "software suite" battle royal. I immediately assumed that a best-of-breed product would always win out in the long run. People would do as they always do: pick and choose their favorite applications among a wide variety. Why would anyone want a canned package with five or six not-so-great applications that are hooked together by a menu and maybe some data exchange?

In the early days of the PC, something called integrated software was chatted up. It was the rage among marketeers who thought it was a great way to lock people into one company and its software offerings. Unfortunately the software bundle usually consisted of one good product surrounded by a bunch of crap. From what I've seen, these packages are now just genuinely mediocre across the board. But this consideration turns out to be beside the point.

Quality notwithstanding, the software suite is the hot ticket today. In fact, they are burying the standalones to the point that vendors with one outstanding best-of-breed package are looking for strategic partners with whom they can put together a suite.

So this brings us back around to the question: What's changed? First of all the terms have changed, and I honestly believe the psychology of the name change alone has accounted for the wide acceptance of the software. The term *integrated* actually brings to mind a time of disturbance in American history. During the

period of racial integration there was a lot of uncomfortable social change, upheaval, riots, protests, you name it. While integrated software has nothing whatsoever to do with race riots or protests, the term recalls racial issues. The Pavlovian response is negative. People cringe. It's subconscious.

On the opposite side of the coin is the software suite. This is the term of the age of excess. An almost perfect moniker. It immediately recalls a ritzy hotel suite. It's classy: a suite. Again the effect is subconscious. The genius who stumbled onto this term and used it as a marketing tool should be given an award.

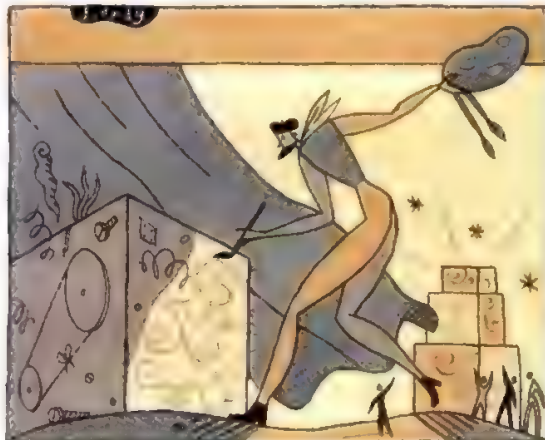
While users have changed, they haven't changed *that* much. Newcomers were rubes in 1983 when integrated software hit the street. The 1993 newcomer is the same rube. If he or she were presented with these same packages sold as integrated software, they'd reject it just as their progenitors did a decade earlier.

Unfortunately, the intelligent best-of-breed approach to buying software is now holding the bag of discontent. If you think about it, the concept and term *best of breed* makes you cringe as much or more than *integrated software*. For one thing, when I think of best

of breed I think of dogs! Or Nazis! This is not the kind of subconscious association that vendors should be making.

I'm starting to hear this term more and more, and it's even showing up in advertisements. The more the public sees it, the faster they will head to the software suite. For the vendors of individual packages to make a deserved comeback, they must redefine their products with elegant conceptual descriptions. Of course, I wish that plain old quality would be the determinant of success.

No such luck. □



Quality notwithstanding, a product's name has a lot to do with its success. It's a subconscious thing.

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John C. Dvorak Inside Track

Comdex is the show you **love to hate**. Every year over a hundred thousand showgoers flock to Las Vegas to see the latest and greatest products that the PC industry has to offer. In the past, little, if anything, new was introduced at the show, but that trend ended this year as the halls were **loaded** with new, cool goodies.

It was a **weird**, different kind of show that somehow symbolized the end of the Reagan/Bush era. It was a party show for sure, earmarked by grandiose booths surrounded by the **monumental boom** that's now taking place in Vegas itself.

Most of the 2,000-plus vendors put together **expensive, huge new** booths this year. Intel had a **monster** booth to celebrate the Pentium. IBM had a bunch of large booths all over the place. And Microsoft owned Comdex with displays of **Windows paraphernalia** everywhere. Microsoft was so big at the show that it sublet space!

As usual the town was jammed and the hotels were filled. This won't last long, considering three major hotel projects are going up, including the **gargantuan MGM theme park** coupled with a **huge green monster** of a hotel. Across the street, the owners of the **frightful and grotesque** Excalibur hotel are building a mountainous **pyramid-shaped hotel**, while the owners of the Mirage are developing a huge new family-oriented theme hotel, too. My first question: **Can you spell overcapacity?**

Maybe the price of rooms will decline. During Comdex it **seems impossible** to get a room or a car, but that's because the show promoter ties up much of the space. The room shortage is really an illusion. I took IBM marketing man John Patrick on a tour of the area to witness **my year-after-year claim**: You can **always** get a room in Vegas. Most of the motels on Fremont Street had their Vacancy signs lit. Inexpensive (and, in most cases, clean) rooms are available all over town to anyone who can drive around. And, yes, you can get a car, too. Rental cars were available from many small rental agencies. My advice, call your local phone company and order a Vegas phone book. Use it to get last minute cars and accommodations.

Back inside the show. Here are a few of the more interesting new devices and developments you'll be hearing about in the months ahead.

What do you call a mouse with no balls? A Honeywell mouse, that's what. Honeywell was at the show with some keyboards and an unusual **ball-less mouse**. The unique dual-wheel design means no more

*Fall Comdex
symbolized the end
of the Reagan/Bush
era. Intel celebrated
the Pentium, Microsoft
owned the show with
Windows, but the small
vendors had the lock
on innovation.*

mouse ball cleaning or replacing. In fact, if you've ever seen the original Doug Englebart mouse design, you'll know the original mouse had no mouse ball. The Honeywell mouse more closely approximates the original model than the ball-technique. The feel of the mouse is identical to the **best ball** mouse. Very cool product. I was impressed. Look for it at a store near you for \$70 to \$80.

QSound was the talk of the show. Just as there are optical illusions, you can have **audio illusions**, and nothing does this better than the QSound system from Archer Communications in Calgary (403-291-2492). These guys have done **over half a million audio experiments** to develop

the algorithms that go into the patented QSound system. Let me just say that it's the darnedest thing I've ever heard from two small speakers. The company had little demo booths on the show floor, and as soon as the demo began you heard a **dog bark** outside the door behind you. You turned around to look. A QSound illusion. From there it got even better with an array of three-dimensional effects that are **phenomenal**. A killer technology. While this system has already been experimented with by some rock stars, expect to see it incorporated into the next generation of games and CD-ROMs.

Can You Hear Me? Dept.: While the small vendors had a lock on the interesting and the innovative, the big companies had a few things to offer, too. IBM showed a slew of **voice recognition** systems that were magical. In the noisiest part of the show (the multimedia exhibits) were the IBM Ultimedia guys with a bunch of voice recognition systems that actually worked and worked flawlessly. Voice recognition will be realized in 1993 if these technologies can get distributed.

Sleeper of the Show Dept.: Lotus had it buried in the back of its booth. I'm not sure that Lotus or anyone else knows what to make of this **meta-spreadsheet** from Lotus. While Excel for Windows and Quattro Pro for Windows were winning all the awards, the true innovation was **Improv for Windows** from Lotus. I'm calling it a meta-spreadsheet or an anti-spreadsheet. Lotus calls it a dynamic spreadsheet and describes it in terms of a 3-D spreadsheet, which it isn't. It's a **totally new and unique spreadsheet** that has to be both the most powerful and the easiest thing to use that that I can imagine. It's so weird that all I can do is recommend that you look at Improv before making any large-scale purchase of spreadsheet technology. This product is **hot!** □

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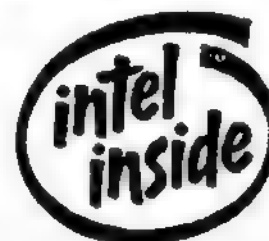
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Jim Seymour

How About Value *Buying*?

Language can be frustratingly imprecise. As a society, we make the Phog Phactor steadily worse by coining new words, adding buzz-phrases to the vernacular, and sometimes even changing the meaning of widely-used words and phrases in midstream.

Over the past year we've heard a lot in the PC world about the notion of "value pricing." Beginning with a round of deep cuts by Dell early in 1992, accelerated by Compaq's rollout of the low-priced ProLinea line last June, we've been through a year of increasingly bloody price wars. Over and over we've been told that these cheap and cheaper PCs are great examples of "value pricing."

Few of us who buy PCs—whether we purchase single machines for ourselves or hundreds or thousands of machines for our companies—are going to carp about lower prices, whatever the hype attached to them. But this use of the phrase "value pricing" is part of a general and probably unfortunate shift of meaning for the term, and can also be a dangerously misleading notion.

A HAPPY TREND

The idea of "value pricing" in general has gotten a lot of attention over the past few years. Most often the term has been used to mark a happy trend, as consumers move away from the glitter and conspicuous consumption of the 1980s into the more civilized and less vainglorious 1990s. Buyers now seem less concerned with making a statement about their wealth and status through their purchases than with getting products of substance, of enduring and satisfying value.

That change in mentality has influenced nearly every kind of product sold in the U.S. The success of IKEA, the home-furnishing chain, is clearly built on an effort to deliver real value for buyers' money. The Gap, Gap for Kids, and Baby Gap stores succeed because they provide a satisfying combination of fashion, quality fabrics and construction, and service.

Note that I didn't men-

tion price. A fundamental part of this new value equation is that buyers don't necessarily want the cheapest, but the *best for their purposes*. You can find superficially similar furniture for less than IKEA charges; you can find hip clothes for less than you'll pay at Gap stores. But you won't get that satisfying mix of quality and a price suitable to that level of quality—what the British call "value for money."

Note that this "value before price" test holds even at the upper end of markets. While Mercedes and Jaguar are reeling from declining sales in the U.S., Lexus sales are soaring. Former Mercedes and Jag buyers looked around and found something they thought gave them better value—even though it cost as much, or more, than they were accustomed to paying. With the average Lexus LS400 sedan going out the door with a price tag in the \$55,000 range, the car is not cheap. But it delivers a level of value for money not seen before in the luxury automobile business. And it has become a smash success.

What does this have to do with PCs?

Two things. First, be wary of very low-priced PCs, no matter how attractive the price and how well-known the marque. And second, don't be so dazzled by low prices and claims of "value pricing" that you fail to look upmarket, too. It's the upper ranges of almost every vendor's value-priced lines that have the machines that deliver the really interesting value for the money.

Again: "Value" and "cheapest" are hardly ever the same thing. Don't let slippery marketers push you, or the people for whom you buy PCs, into purchasing machines that give you less than you need. Fast, powerful, appropriate PCs at low prices are what you're after—not



True value may come at the top, not the bottom, of a line. In the long run, quality counts more than low price.

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PC/93

Jim Seymour

feeble boxes at fire-sale prices.

The first point is simple enough: We all know that ads for \$800 PCs are not very realistic. Yet we see machines with well-known names on them at prices that low. While these systems may be decent choices for a few users—even after the vendors add \$500 to the price to make the systems marginally acceptable—you and I know that they're not going to be satisfying computers for very long. Forgoing caches, using flickery interlaced monitors, shipping so-called Windows-ready machines with 2MB of RAM and 40MB hard disks, and other cost-cutting measures don't deliver value by any standard.

VALUE AT THE TOP

The second point—that you should look to the top of the value line—is less obvious. I've been spending a lot of time lately testing and simply using PCs from vendors' value lines. Without exception, the interesting ones have been the upper-end machines. They aren't priced at \$800, but they're low-priced for what they deliver. That's the real secret to this so-called value-pricing revolution.

Hyundai's new machines are a great example: At the upper end, units such as the Hyundai 433SP and 466D2, with fast disks, fast caches and very fast local-bus video, knock competitors' machines for a loop.

Or look at Compaq's new ProSignia servers. These are serious business machines, well designed and well built. But they cost less than so-so clone servers did a year ago.

Or look at Zeos's new 486DX2-66. We were dazzled when we tested it for our roundup of 66-MHz DX2s in the last issue ("DX2/66: The New Speed Limit," January 26, 1993). Its Graphics Winmark score of 42.64 megapixels per second far eclipsed any score we'd ever seen—or expected to see for some time to come—on our benchmark test. Yet at a little more than \$3,000, it costs less than the average machine in that group. The Zeos 486DX2-66 was about \$1,000 more expensive than the very lowest-priced one in our roundup, but it delivered so much more value that there was little comparison between the two.

That's value pricing.

Or maybe, to coin a better term, it's value buying. Because the issue isn't how cheap vendors can make them, but how much we need—and get—for our money. Today that spread is wide indeed. □

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Cost	\$99.95	Expensive
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infiniType Plus v. the Little Typeface Companies

	Us	Them
Font Quality	Superior	Inferior
Cost	\$99.95	Comparable
Format	PostScript and TrueType	One or the other, not both
Scaling Engine	Yes	No (if yes, fewer faces)

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Bill Howard

Universal Confusion

Everyone wants PCs, printers, and monitors that cost less. Vendors believe one way to control costs lies in building universal models for the world market. You may find, however, that your real cost, in aggravation and lost productivity, is far

greater than the manufacturer's up-front savings.

Welcome to the one-size-fits-all era of high technology, in which hieroglyphic markings on your PC or monitor replace useful, easily understandable words. Instead of the words *brightness* and *contrast* on the monitor controls—words that would have to be changed for each major language—you see pictures of a sun and of a circle with a horizontal line through it (a half-moon?), and you can't remember which is which. Rather than the word *keyboard* marking the PC's keyboard connector, you get a tiny iconic drawing of a keyboard with little squares representing keys; it looks more like a sheet of graph paper than a keyboard. The serial port icon may be 1010101, representing a binary data stream. Rendered in sans serif type, it looks more like line, circle, line, circle, line, and so forth: IOIOIOI.

If this sounds like an Andy Rooney harangue about life's travails ("You know what bothers me? You know how the soap slips off the shelf in the shower when there's shampoo in your hair and you've got your eyes closed. . ."), think about the impact this has on productivity multiplied by 100 million PC users.

Consider the poor laptop user. For years he's been lugging around a universal transformer the size of a paving brick. *Universal* means it works on both 120 and 220 volts and weighs a lot more than it has to.

33 PERCENT OFF

Vendors could knock a third off the size and weight by making it 120-only, but they want the laptop user to have the freedom to head off to Europe on a moment's notice and plug in to 220 volts. What laptop makers should be doing is making two versions of the transformer: one for domestic consumption only, one for

the worldwide market (and perhaps a third that's 220 volts only). Most smart users buy one transformer for home and one for the office, so they could buy one of each and travel stateside with the lighter one.

Then there's the PCMCIA specification for credit-card-size I/O devices, most commonly used for modems. The modem cards are too small to fit standard RJ-11 phone connectors, and the PCMCIA committee didn't see fit to allocate any of the 68 available pins for an internal phone line connection. Instead, you have to carry a bulky, six-inch RJ-11 adapter cable called a DAA, which also contains the smarts that tell your modem it's working with a specific country's phone system. This lets vendors make one universal product (the modem card) and modify it (with one DAA per country).

To make life easier and to boost productivity for users, hardware vendors should deep-six the hieroglyphics and icons and replace them with labels bearing the international standard of business communication: English. This move will annoy the heck out of icon designers and human-factors engineers who've done years of research on the topic. It may also lead to griping about how this resurrects the ugly-American syndrome. The

fact is, we already have lowest-common-denominator equality: The icons around today are equally impossible to read in any language.

As the size of international markets warrant, vendors may use labels or moldings in other languages. If a vendor thinks a language is too small to support with a custom version, someone else will step in. Yes, that will make more work for international companies. But they're in business to make life easier and more productive for users. Too often, it's been the other way around. □



Sometimes, an English word is clearer than an international icon. Especially when it's on your PC.



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CIRCLE 379 ON READER SERVICE CARD

APPLICATION ADD-INS

Mix-and-Match

One of the best ways to grow a more productive spreadsheet or word processor is to add features and functions through third-party software. We've picked 48 add-ins that stretch your applications.

In a perfect world, software developers would build into their core products all the features you would ever need—the ultimate personal product. In this world, it has never worked that way.

The very success of PC software is based on mass-market appeal: the most crunch for the biggest bunch. From the beginning, this approach created a golden opportunity for enterprising independent programmers to fill in some of the functionality gaps left by one-size-fits-all software. So, not long after the killer applications (such as Lotus 1-2-3) began to establish their presence in the market, along came ancillary products, such as Sideways, that helped fine-tune them to the needs of individual users.

Then, as now, this "marriage" between mass-market developers and wide-ranging but more targeted developers produced a new kind of software animal—the application add-in. End users reaped the bounty of this mating in the form of richer and more versatile software tools. Today, the add-in market appears stronger than ever, with almost every major application, from database

managers to desktop publishers, boasting at least a modest constellation of plug-in companion products.

SCOUTING REPORT

For this survey, we focused on those add-ins that work with applications that, for most of us, do the bulk of our daily work: Lotus 1-2-3 (for both DOS and Windows), Microsoft Excel, and Borland International's Quattro Pro and Quattro Pro for Windows in the spreadsheet category and Microsoft Word for Windows (WinWord) and WordPerfect (for DOS and Windows) in the word processor category.

In order to keep our survey focused, we maintained a clear distinction between add-ins and utilities. Add-ins are ancillary programs designed to augment a single application or a limited number of related applications—like Spellin!, Intex Solutions' spell-checker for 1-2-3 spreadsheets—as opposed to those aimed at a broad range of not-necessarily-related applications.

Another, more crucial, distinction we drew was that products integrate seamlessly with the host application. You have

by Ted Stevenson

Featureware



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to exit from your application to run a utility (the file manager XTree, for example); add-ins, on the other hand, should feel and function like a part of your application (like Fileware, the WinWord add-in from Total System Solutions, which is invoked right from WinWord's menus).

With these guidelines in mind, our review team (which is composed entirely of *PC Magazine* contributing editors) assessed an initial field of 140 spreadsheet and word processor add-ins (see "140 Ways to Add In Productivity" for the complete list), distilling it down to a select list of 48 for detailed review. Obviously, this category is far too diverse to select an Editors' Choice. Each one of these products offers a substantial solution for real-world work—a kind of "Best of Add-Ins."

MANY FACES OF INTEGRATION

Add-ins can weave themselves into the fabric of their hosts in an ingenious variety of ways. Many operate as shells around their parent program—some, such as By Design, Streetwise Software's desktop publishing tool for WordPerfect, go so far as to replace the parent program's interface with their own. Other shells, like the Uteley-Cross Correspond-

ence Manager, pop up within the application at the appropriate times. Another large group of add-ins takes the form of macros, either mapped to custom keyboard layouts or invoked by hotkeys or from menus. Still others are created using tools supplied by the applications vendor. The most notable of these is the Lotus Add-In Development Kit—a set of application development tools that is provided to third parties to allow custom applications to be integrated directly into the 1-2-3 environment. Another group automatically captures and reprocesses printer output. All the font add-ins we reviewed fall into this group. Finally, we have the Windows add-ins, many of which take the form of dynamic link libraries (DLLs) or macro programming languages.

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THE ADD-IN UNDERBELLY

The riches that add-ins provide have a small price attached. Each add-in has a particular set of demands to place on your environment. In the DOS world, these apps occupy precious RAM—in some cases much more than is probably desirable. And, as in the case of the 1-2-3 2.x add-ins, many of these cannot exist anywhere but in conventional memory. Under Windows, it's a different story. Since Microsoft's graphic environment views memory as one contiguous block and can use virtual memory, Windows add-ins typically have little impact on memory.

THE LANDSCAPE

To help you navigate the add-in territory, we've created a three-part taxonomy:

The first group, consisting of what we call "remedial" add-ins or "patches," brings up-to-date features to older (primarily DOS) versions of applications whose developers can't or won't implement them directly. In the spreadsheet area, for example, Intex Solutions' 2-D Graphics and 3-D Graphics broaden the charting capabilities of 1-2-3 2.x by adding more data ranges and more graph types. Stairway Software's ScreenExtender brings WordPerfect 5.x into the modern world by supplying screen fonts that more accurately display WordPerfect text and text enhancements. All the font add-ins really fall into this category.

A second group of add-ins, the ones we call "vertical extensions," offers features for people doing specialized tasks. (If you guessed that this was the biggest add-in group, you'd be right.) Spreadsheets are a natural breeding ground for vertical extensions. After all, if 200 statistical, engineering, and financial functions are good, 201 are better, right? While we did look at a number of specialized function li-

*The riches that add-ins
provide have a small
price attached. Each one
places a set of demands
on your environment.*

baries, we also saw some more adventurous forays into the vertical with products such as ForeCalc from Business Forecast Systems that, in conjunction with Lotus's 2.x and 3.x versions of 1-2-3, predicts financial performance based on historical data. Palisade Corp.'s @RISK, for Excel and 1-2-3 spreadsheets, takes business forecasting a step further by calculating the statistical likelihood of outcomes being better or worse than predictions. For the ultimate in technological sophistication, Promised Land Technologies' Braincel carries out forecasting tasks in Excel and Lotus 1-2-3 for Windows spreadsheets without numbers-based rules using the latest neural network techniques.

But don't assume that spreadsheets own the entire vertical market. SuperScript Pro from Inherit The Earth Technologies turns WordPerfect 5.1 into a dedicated play- and screenplay-writing package. MathType from Design Science supplements the equation-formatting capabilities of the big three Windows-based word processors.

THE HORIZONTAL PLANE

Finally, there are the add-ins for the rest of us—the products that add breadth to our applications, usually by making them easier or more convenient to use. Funk Software's Noteworthy for 1-2-3 2.x spreadsheets is a good example. It brings Post-it note convenience to annotating worksheets. The Button Cube from Software Workshop adorns WordPerfect for Windows with multiple, customizable task icon groups that extend the program's own Button Bar.

WOPR, a collection of add-ins for WinWord from Pinecliffe International, improves on that application's envelope-printing facility (a significant ease-of-use innovation in its own right). WOPR also provides an icon editor that can create new icons, even capturing screen images to do so, as well as sprucing up WinWord's existing icons. Alki Software Corp.'s MasterWord adds breadth to Word for Windows in so many ways it's difficult to enumerate them briefly. An improved and expanded help system, iconic cataloging and selection of WinWord templates, and easy cut-and-paste editing of template and macro commands are among the highlights.

WINDOWS: ADD-IN KILLER?

Throughout our investigation, a thematic undercurrent, driven by a set of questions, lurked in the background: Where does Windows fit into the picture? Does the whole concept of the add-in change in this world, where applications can borrow each other's features through OLE?

In one sense, at least, it clearly does. For users with suites of Windows applications that share common resources such as charting and drawing modules, spell-checkers, and the like, the remedial role of add-ins certainly disappears. There's no reason to create a charting component for an application that can borrow it from "resource central." (For a detailed discussion of these issues, see the sidebar "When All the World's an Add-In.")

On the other hand, vertical and even

horizontal add-ins will clearly survive and flourish, although the distinctions we've tried to maintain here, between add-ins and utilities and integrated versus nonintegrated accessories, will doubtlessly blur. It seems incontestable that smart developers will always find things to do that core applications can't do on their own—and smarter, easier ways to do the things they can. Today's crop of recent add-ins to major Windows applications certainly supports this conclusion.

As you flip through the following reviews and sidebars, you'll probably be on the lookout for products that add features you've been wanting to applications you now use. You may want to scan the list more fully, though. There's some amazin' stuff you may not be looking for but that might open new doors for you.

Spreadsheet Add-Ins

Personics Corp.

@Base

BY BEN Z. GOTTESMAN

Personics Corp.'s \$195 @Base for Lotus 1-2-3, Release 2.4, is a model of how spreadsheets should work with databases. The 76K add-in lets users query and modify existing dBASE .DBF files or create new ones. The size of the database is limited by disk capacity (up to 32MB), not by memory.

The 10K BASEFUNC.ADN contains several @ functions that can be integrated directly into your spreadsheet for performing logical and statistical operations on your database. The 16K BASEUTL.ADN adds several useful utilities that let users convert existing 1-2-3 databases to .DBF format or append files stored in ASCII format to existing .DBF files. BASEFUNC and BASEUTL will not work if BASE.ADN is not loaded.

@Base functions can be integrated into 1-2-3 macros. This will allow experienced macro programmers to set up data-

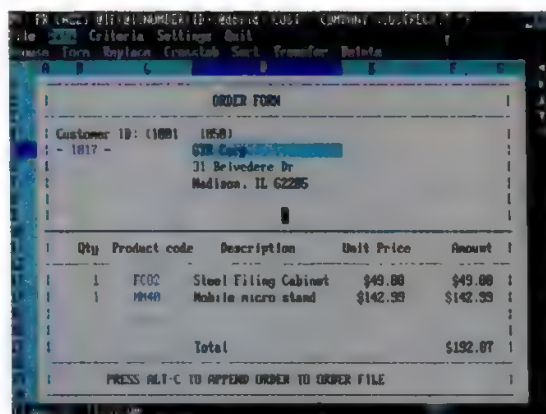
base applications easily. Creating cross-tabs is also a simple process. Just select /Data, Crosstab from the @Base menu, point to the fields you want to use, and voilà!

Anyone who has tried to create search criteria within the Big Three spreadsheets will fall in love with @Base. Rather than entering criteria in a range of cells, users can specify criteria within the @Base functions. Criteria can contain strings ("NAME = Smith") or cell references ("NAME = D2").

Personics also offers the \$90 @Base Option Pac, which includes relational capabilities, indexing, and computed fields. All things considered, @Base is a fine example of the way database/spreadsheet

Works with:

• Lotus 1-2-3 for DOS 2.x



Personics's @Base makes it easier to access your .DBF files from within Lotus 1-2-3. The program's add-in functions allow you to specify criteria directly within your formulas.

Applications Add-Ins

integration should be done.

Personics Corp., 234 Ballardvale St.,
Wilmington, MA 01887; 800-445-3311,
508-658-0040. List price: \$195.
Circle 483 on reader service card

Greymatter International

The @Library

BY CRAIG STINSON

Greymatter International says it spent a couple of years monitoring the tips columns in Lotus Magazine, collecting data

Works with:

- Lotus 1-2-3 for DOS 2.x
- Lotus 1-2-3 for DOS 3.x

on the wishes and frustrations of Lotus 1-2-3 users and, wherever possible, creating custom functions to meet their expressed needs.

The resulting "general applications" @Library is a set of 48 custom functions with something to please nearly every 1-2-3 aficionado.

Particularly useful is a set of statistical functions that ignore NA, ERR, and text values. With @NEAVG, @NEMIN, and @NEMAX, for example, you won't need to worry about errant label cells that would otherwise be seen as zero values. With @NESUM, you can keep a running total of entries in a range and use NAs in cells still waiting for data.

Other handy items include @LWIDTH, which returns the length of the widest label in a range; @OCCUR, which returns the number of occurrences of a given value in a range; and @LDATE, which turns a date number into a fully spelled-out string suitable for use in form letters or reports.

The @Library's financial functions aren't as elaborate as those of Tech Hackers' Financial @nalyt (see review on page 120). But the set does include functions for converting nominal interest rates to effective interest rates (and vice versa), as well as a future value function that handles varying rates of interest.

Greymatter's other two @Library collections, The @Library—Scientific and Engineering Applications and The @Library—Statistical Applications, will be of interest to more specialized users. The stat package includes functions for performing significance tests, determining geometric and harmonic means, and finding ordinal ranks and percentiles.

The scientific and engineering package covers Bessel functions of integer order, gamma and beta functions, and more.

Greymatter International, P.O. Box 410388, 173 Otis St., Cambridge, MA 02141-0004; 617-876-6969. List price: \$79.95 per library.

Circle 494 on reader service card

Convergics Corp.

@Project/Resources

BY CRAIG STINSON

@Project/Resources is an add-in that provides extensive project-management functionality within the 1-2-3 grid. A

Works with:

- Lotus 1-2-3 for DOS 2.x

Lotus-style menu prompts you to define project parameters (such as tasks, durations, scheduling dependencies, and resources) and builds a worksheet table from your replies. Custom @ functions—automatically entered via the menu commands—define task relationships, determine dates and slack times, calculate costs, and so on. A graph submenu offers Gantt charts, Pert (program evaluation and review technique) charts, resource histograms, and calendars—complete with attractive, customizable color coding. The graphs may be incorporated into standard reports via WYSIWYG, but only as frozen .PIC files.

@Project/Resources offers three modes of scheduling: precedence (critical-path), resource-level, and resource-limited.

Besides the familiar operating environment, Convergics Corp.'s add-in approach to project management offers the spreadsheet user two conveniences. You can easily manipulate the worksheet table and its custom functions to play what-if; you can, for example, measure a schedule's dependence on particular resources. And any of the system's custom functions may be used in ordinary worksheet models. A budgeting model, for example, might want to call cost-oriented functions such as @TASKCOST or @PERCOST. Macro-driven applications may be designed to mod-

ify their behavior based on functions such as @ISCRITICAL.

Convergics Corp., 7910 Ivanhoe Ave., #405, La Jolla, CA 92037; 619-689-2433. List price: \$249.

Circle 516 on reader service card

Decisioneering Inc.

Crystal Ball

Palisade Corp.

@RISK

BY CRAIG STINSON

With any luck, when all of your planning and plotting is done, your carefully crafted spreadsheet projection will produce an accurate picture of your company's fortunes over the coming years. But what if you're not so lucky?

To prepare for this and other adversities, reach for a risk-management add-in, such as Decisioneering's Crystal Ball or Palisade Corp.'s @RISK. Both run simulations from within your spreadsheet model and in the process compile statistics on the whole range of possible outcomes.

For example, suppose you want to model income, expenses, and profit over each of the next five years. You can guess at these figures, but the further ahead you look, the more uncertain your estimates become. With a simple scenario manager (such as the add-in that Microsoft ships

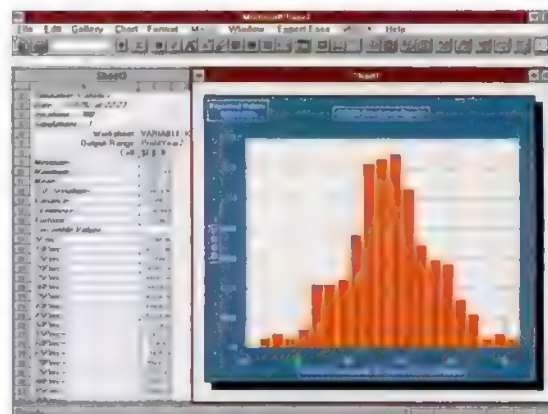
Works with:

@RISK

- Lotus 1-2-3 for DOS 2.x
- Lotus 1-2-3 for DOS 3.x
- Microsoft Excel

Crystal Ball

- Microsoft Excel



Palisade Corp.'s add-in @RISK uses custom functions to specify distributions and presents its output in normal Microsoft Excel 4.0 document windows.

Applications Add-Ins

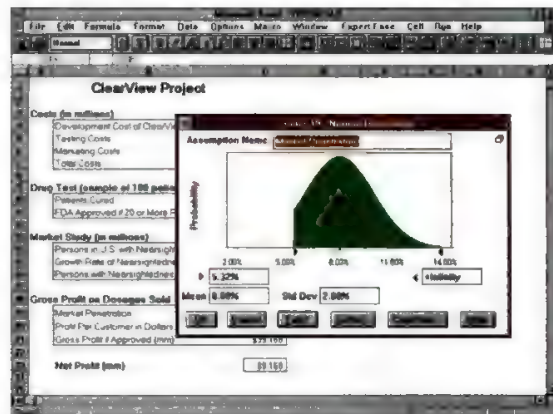
with Excel 4.0), you could specify best, worst, and intermediate cases, then create a table to compare them. But with Crystal Ball or @RISK, you can do much more. You can determine the most likely outcome, graph the range of outcomes that have at least a 95 percent probability, discover the likelihood that your profit at five years will exceed some target amount, and order up statistics to support any decision you could make.

In both programs, you start by indicat-

Ball offers eleven distribution types (normal, triangular, and poisson, for example), plus a custom mode in which you can design your own distribution.

@RISK, while a good deal tougher to learn than Crystal Ball, offers more than twice as many distribution types, as well as some other features of interest to advanced users. Most important, its distributions are specified via custom spreadsheet functions rather than by menu command. This makes it easier to integrate risk modeling with your traditional spreadsheet work. In its Excel version, moreover, @RISK uses the spreadsheet's own graphics engine. Crystal Ball, in contrast, depends on a rather inflexible proprietary charting engine.

Because of its ease of use and the quality of its documentation, Crystal Ball is the better choice for Excel users with relatively light backgrounds in statistics. (It is also half the price of @RISK.) For 1-2-3 users, or for Excel users with advanced needs and training, the safe choice is @RISK.



Crystal Ball lets you define distribution parameters visually. To truncate a normal distribution, for example, you can simply drag an end point on the green chart.

ing the cells containing uncertain values. For each such variable, you supply parameters that describe the uncertainty. For income or expenses, for example, you might choose a "normal" (bell-shaped) distribution, using your best guess as the mean and increasing the standard deviation at each successive alteration in time (to account for the diminishing certainty of your mean). To model the impact of all-or-nothing events, such as the appearance of competitors or the winning of particular contracts, you could, for example, specify discrete or triangular distributions.

Having described the variables, you tell the add-in which outputs are of interest, how many iterations you want to run, and what mode of sampling you want to use. (Both programs offer Monte Carlo and Latin Hypercube sampling.) The programs then generate random numbers for each variable, recalculate again and again, and tally up the results.

Designed initially for the Macintosh, Crystal Ball makes gorgeous use of Windows. Its lucid manual effectively teaches the rudiments of risk analysis. Crystal

Palisade Corp., 31 Decker Rd., Newfield, NY 14867; 607-277-8000. List price: \$395.

Circle 536 on reader service card

Decisioneering Inc., 1380 Lawrence St., #610, Denver, CO 80204; 303-447-6464. List price: \$195.

Circle 521 on reader service card

Intex Solutions Inc.

2-D Graphics

3-D Graphics

BY M. DAVID STONE

If you're up against the graphics limitations of Lotus 1-2-3, Release 2.x, and you do not want to move to another program, you'll probably be interested in 2-D Graphics and, to a lesser extent, 3-D Graphics. From Intex Solutions, the add-ins cost \$99.95 each or \$150 if purchased together.

Works with:

2-D Graphics

- Lotus 1-2-3 for DOS 2.x

3-D Graphics

- Lotus 1-2-3 for DOS 2.x

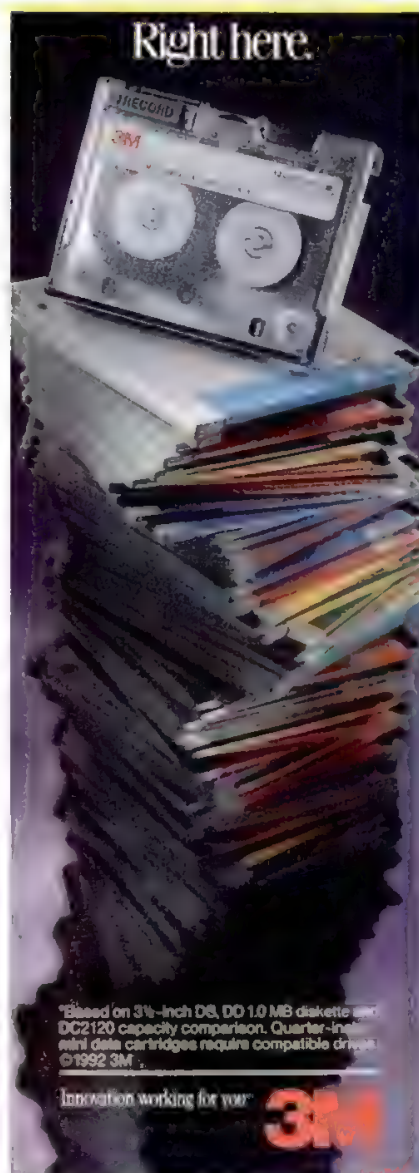


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Drives. **This service, provided by Contracted Service Providers, is specific to hardware products and may not be available in certain geographic locations. Consult the Compaq Customer Support Center for details. †Suggested retail price; reseller price may vary; price indicated is for non-disk-configured COMPAQ ProSignia 486/33 Model 11/EL, not pictured here; monitor, NetFlex Controller not included. Models including hard drive and NetFlex Controller start under \$4500. The Intel Inside logo is a registered trademark of Intel Corporation.

CIRCLE 308 ON READER SERVICE CARD

■ When All the World's an Add-In

By Michael J. Miller

Programs that are designed to plug into other programs date back to the earliest days of personal computing when, for example, you usually had to purchase spell-checkers separately from word processing packages. Particularly with the advent of graphical operating environments, such as Microsoft Windows and OS/2, however, programs designed to work with other programs have become more commonplace. In fact, the emergence of new standards, such as Object Linking and Embedding (OLE) in Windows and the System Object Model (SOM) in OS/2, may eventually make every program work like an add-in.

In the Windows arena, we've already seen a number of ways for programs to act as add-ins. As in the DOS world, there are add-ins written to work with a specific host program (like Alki Software Corp.'s MasterWord with Microsoft Word for Windows). But because most Windows packages use Dynamic Link Libraries (DLLs), we have also seen a number of DLLs designed to work with specific packages, particularly in the programming arena. Third-party DLLs, including database tools, are fairly common add-ins for programming tools such as Microsoft Visual Basic and Borland's Turbo Pascal for Windows.

TAGALONGS

Lately, we've been seeing standalone applications designed so that they attach to the menus of the core applications in which people tend to spend most of their day working. An early example of this is the way Polaris Software's PackRat can attach itself to Microsoft Word for Windows.

Continuing in that vein, the emergence of new standards for mail-enabled applications should allow "Send Mail" commands to appear in the File menus of word processors, spreadsheets, etc. Today, we typically see Lo-

tus apps supporting cc:Mail and Lotus Notes through the Lotus-sponsored VIM API standard and Microsoft apps supporting Microsoft Mail and other packages that comply with its own MAPI standard. Still, we will begin to see more and more applications supporting multiple electronic mail systems, as application vendors begin to support the existing standards, and as MAPI and VIM edge closer together.

MODULAR APPS

A more radical implementation of the add-in principle, though, comes from applications that are themselves conglomerates of smaller, separate applications operating together seamlessly.

*The segmentation
of applications
into smaller tools
has advantages
for both developers
and users.*

For instance, when you buy Ami Pro, Microsoft Word for Windows, or WordPerfect for Windows, you get drawing features. In each case, the drawing module is a separate program (add-in), integrated in such a way that it looks like part of the main package.

This is accomplished differently in different packages: WinWord, like most Microsoft applications, uses OLE as its link to the drawing module. When you click on a drawing in your document (a "draw object"), you find yourself in MS-Draw with that object and all of your drawing tools.

One problem with the OLE approach, though, is that you end up editing the inserted object as a separate part, disconnected from the larger doc-

ument that it's part of. Lotus has addressed this through its Tools approach in products like Ami Pro. When you click on a drawing in Ami, you still see your complete document with the object embedded, but your menus and tools change to those of the drawing module.

This *in situ* editing is important because it means that you are able to see the entire document as you work on different parts of it with different tools. Hewlett-Packard moved in a similar direction with NewWave, IBM has discussed it as a goal for future versions of OS/2, and Microsoft has demonstrated similar capabilities for the forthcoming OLE 2.0 specification.

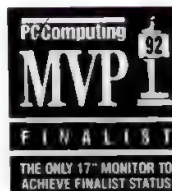
THE WHOLE AND THE PARTS

The segmentation of applications into smaller tools, each functioning like an add-in to other applications, has advantages for both developers and users. For developers, it means the difference between creating a single drawing module for all applications and building separate modules for word processors, spreadsheets, and graphics programs. For users, it means getting used to one drawing tool or one spell-checker that works in every application. Moreover, if a particular drawing module or spell-checker is not to your liking, you will (theoretically) be able to choose a third-party alternative. Similarly, you could add certain desired features to your environment.

As these concepts are realized, we move from a software environment defined by large, monolithic applications to a more document-oriented approach: Documents will consist of parts like text, spreadsheet, and graphics, each edited by a different application—and you will see only the appropriate tools for editing the part of the document you're working on. You will be able to add in or replace the tools you want—and every software tool you buy will be an add-in to every other tool. □

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Actual unretouched screen image produced from Modern Medium Inc. (RenderStar 2).

CIRCLE 280 ON READER SERVICE CARD

These packages offer both better and worse graphics than 1-2-3, Release 2.4. They're better because they add new capabilities. 2-D Graphics increases the maximum number of data ranges from 6 to 12 and adds several graph types—including bubble graphs, dual y-axis graphs, and Angle-Radius polar graphs.

They're worse because they are not that much more convenient than the standard 1-2-3 graphs menu. The 2-D graphs menu looks almost identical to the 1-2-3 graphs menu; the only difference is a few added choices. And you won't find a dialog box that shows all the graph settings at once. That makes the add-in far less convenient to use than the built-in feature when modifying a graph. The 3D-Graphics add-in offers a similar menu with the same flaw.

Also, the graphs themselves aren't visually exciting; you won't find anything equivalent to the three-dimensional effect for two-dimensional bar charts found in 1-2-3, Version 2.4.

Intex Solutions Inc., 35 Highland Circle, Needham, MA 02194; 617-449-6222. List price: \$99.95 each, \$150 for both. Circle 522 on reader service card

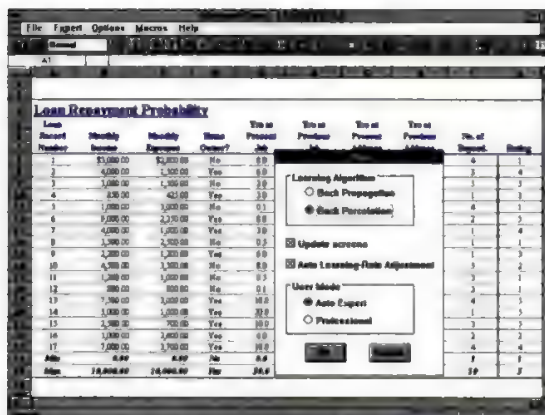
Promised Land Technologies Inc.

Braincel

BY CRAIG STINSON

Promised Land Technologies' Braincel is an add-in that lets Microsoft Excel and Lotus 1-2-3 for Windows users make predictions based on historical data, without formulating rules. The key is neural-net technology, a form of machine reasoning designed to emulate the ways in which humans learn from experience and correlate past events with future expectations. This approach can be used to, for example, forecast market behavior on the basis of economic indicators or develop new pharmaceutical agents based on properties of other compounds.

To create a Braincel neural-net "expert," you start by setting up a database showing historical outputs and all conceivably relevant inputs. You "train" the net on a portion of this data, test it on some additional historical data that it



Under Microsoft Excel 4.0, applications like this one, in which various inputs contribute to a decision regarding loan qualification, are ideal for Braincel.

hasn't seen before, and then put it to work when you're satisfied with its competence. The training steps are easy, but interpreting the results (deciding how much training is enough and how much confidence to place in the net's predictions) may take some discernment. Also, getting the best results often requires some preprocessing of the data.

Fortunately, the spreadsheet grid is an ideal platform for this data preprocessing, as well as for analyzing Braincel's output. And both the Excel and 1-2-3 for Windows versions come with extensive macro-support to help you integrate Braincel with other spreadsheet-based applications.

Promised Land Technologies Inc., 900 Chapel St., #300, New Haven, CT 06510; 800-243-1806, 203-562-7335. List price: \$249.

Circle 523 on reader service card

Symantec Corp.

The Budget Express

BY BEN Z. GOTTESMAN

Although few Lotus users would ever admit to having it in the first place, The Budget Express may be the cure for the oft-denied Microsoft Excel envy. The 64K add-in gives Lotus 1-2-3, Release 2.x, outlining, consolidation,

and goal-tracking on par with Microsoft's spreadsheet.

In many ways, Budget Express's outliner is much more powerful than Excel's outliner. Budget Express will automatically create subtotals and grand totals for both rows of categories and columns of dates. The add-in also lets you alternately hide and show column details.

Like Excel, Budget Express can also fill in your column headings for you. Enter "JAN" (or "January" or "Jan") in the first column, press the right arrow key, and "FEB" (or "February" or "Feb") automatically appears. Continue to press the right arrow and Budget Express fills in the rest of the months.

Users who feel stymied by the limited

	01	02	03	04	Total
ASSETS					
Current Assets	1226.42	1719.40	2330.16	2604.59	7880.65
Long Term Assets	1181.65	1455.68	2136.16	3815.63	8589.12
Total ASSETS	2408.07	3175.08	4466.32	6420.22	16469.77
LIABILITIES					
Notes Payable	79.44	10.23	231.55	304.12	785.34
Accounts Payable	140.74	144.18	280.22	153.24	658.38
Taxes Payable	140.80	172.19	164.94	282.90	680.93
Other Current Liab	589.61	757.72	392.38	1617.14	3856.85
Deferred Taxes	83.68	131.91	139.91	224.73	580.23
Minority Interest	0.00	0.00	0.00	0.00	0.00
Long Term Debt	62.59	19.86	12.44	887.15	981.24
Other Long-Term Liab	53.83	83.59	161.53	267.65	566.60
Total Liabilities	1065.85	1318.88	1918.97	3743.81	8047.51

Symantec's Budget Express automatically totals groups of cells. Columns containing monthly data can easily be summarized by quarter and year.

linking capabilities of 1-2-3, Release 2.4, will welcome Budget Express's consolidation feature. It can sum data in dissimilar worksheets to create a global view. It can match row and column data between spreadsheets, even if the rows and columns are in different order.

Among Budget Express's other features is a Goal Tracking option that tracks how close you are to your goal as you make modifications to your data. If you decide you don't want to keep the modifications, just select "Analysis, Restore."

Unfortunately, Symantec Corp. has not updated its Budget Express program since 1990. As a result, users of 1-2-3, Release 2.4, cannot use a mouse with any

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ActionMedia II won "Best of Comdex/Fall '91" and was recently named "Development Product of the Year" by CD-ROM Professional Magazine.



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Expert Ease

Because the database wizard is such a useful item—and something that Microsoft so obviously should have done itself—this aspect of Expert Ease runs the risk of being rendered obsolete by Ex-

Circle 484 on reader service card

Financial Analyst

The financial functions built into Lotus 1-2-3, Microsoft Excel, and Borland's Quattro Pro are fine for rough-and-ready calculations of cash flows and annuities. But those who need more flexibility and power ought to consider Tech Hackers' Financial @nalyst, a fabulous relief package.

Tech Hackers' amortization functions accommodate partial payments, advance payments, and balloon payments. They also calculate interest on any residual amounts that are due after the final payment. The NETPV (net present value) function allows users to assign different discount rates for each cash flow. The SCMARG (scenario margin) function calculates the margin to add to each dis-

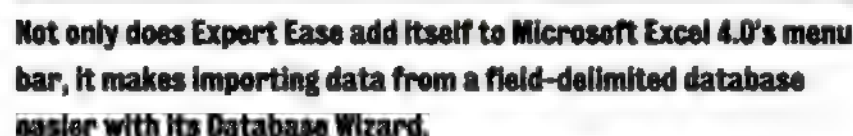
Circle 505 on reader service card

ForeCalc

Forecast!

Turning historical information into accurate predictions is the business of two Lotus 1-2-3 add-ins: Business Forecast Systems' ForeCalc and Intex Solutions' Forecast! Both of these products extrapolate from time-series data, using standard statistical forecasting techniques. Assuming the trends and seasonality factors affecting your history are likely to continue, these programs can provide a reliable platform for planning.

- Lotus 1-2-3 for DOS 2.x
- Lotus 1-2-3 for DOS 3.x
- Lotus 1-2-3 for Windows
- Microsoft Excel
- Quattro Pro (DOS)



The best of the rest is a pair of File Open/File Save alternatives. These "path-finder" commands let you assign aliases to commonly used directories and files. You can create plain English names of any reasonable length, using alpha-

"Recommended."
Jerry Pournelle, Byte, July 1992

Inside Out



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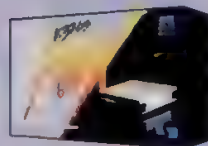


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■ Tools on the Horizon

by Craig Stinson

By the time this issue of *PC Magazine* appears in print, two important new tools will have joined the growing list of add-ins for the Microsoft Excel 4.0 spreadsheet application.

SOLUTION EVOLUTION

Evolver, from Axcelis (Seattle, Washington), is an optimizer that employs "genetic" algorithms. Like the Solver, the add-in product that Microsoft Corp. ships with Excel, as well as Frontline Systems' What-If Solver (see the review in this article), Evolver automates the process of finding the best possible combinations of inputs to a spreadsheet model. You may use Evolver, for example, to find the least expensive way to deploy staffing resources, the most cost-effective locations to build new product warehouses, the shortest nonrepeating path to and from a large number of cities in which you regularly do business, and other similar types of input combination problems.

Evolver's genetic approach allegedly mimics nature by iteratively sampling the entire solution space of a problem at random, then letting the best trial solutions (in effect) mate and reproduce their winning genes. For example, if a problem's solution were expressed in *x,y* coordinate pairs, winning *x*'s on each trial would be crossed with winning *y*'s in a process that would, after many trials, lead to a best-possible coupling.

Compared with the GRG (generalized reduced gradient) approach used

by the Excel Solver, Evolver's genetic method has the advantage of not getting stuck on local optima. Evolver will therefore be the tool of choice for problems that involve many discontinuities—for example, problems that involve the use of lookup tables. Solver's numerical techniques are faster, however, and Solver's solutions are supported by a wealth of analytical information that is not available via Evolver.

ENTERPRISE INFO

The Microsoft Excel EIS Builder is one component of the Microsoft Open EIS Pak, a toolkit for building what Microsoft is calling "enterprise information systems." By coining this twist on the traditional meaning of EIS, Microsoft underscores its intention to move easy-to-use data-browsing systems beyond the executive suite and onto desktops at all levels of management. The EIS Pak also constitutes Microsoft's most persuasive demonstration to date of the potential for integrating information across multiple Microsoft Windows applications.

The EIS Builder itself is an application generator built with Excel's macro language. The user invokes it by opening an .XLA file in Excel, and the end result of its labor is a large Excel macro stored as an .XLA. But the intricacies

of macro programming are skillfully hidden, making the EIS Builder accessible to anyone with moderate Excel skills.

Building an EIS is a matter of first creating the various "views" that the end user is to see (these may be Excel tables or charts, or screens created in other DDE- and OLE-supporting applications), then navigating through the EIS Builder's many dialog boxes. These dialogs let you create custom menus, add buttons and "hot" zones to views, link views by means of "scripts," and deactivate elements of the interface that would be hazardous to the end user.

Other elements that are part of the EIS Pak include a set of impressive sample applications, a 10-minute video promoting the EIS concept, and some additional documentation regarding interapplication communication under Windows. □

*Evolver automates
the process of
finding the best
possible combinations
of inputs to a
spreadsheet model.*

Evolver

Axcelis Inc., 4668 Eastern Ave. North, Seattle, WA 98103-6932; 206-632-0885; fax, 206-632-3681. List price: \$695.

Circle 532 on reader service card

Microsoft Open EIS Pak

Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6339; 800-426-9400, 206-882-8080. List price: \$99.

Circle 533 on reader service card

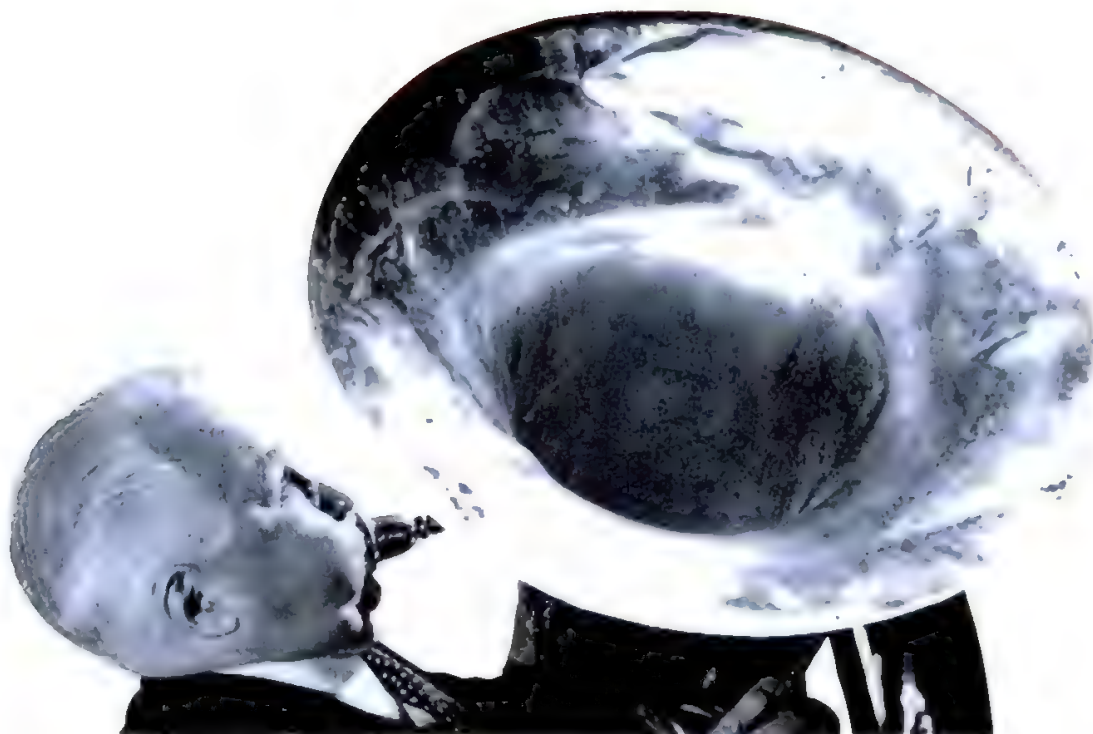
ForeCalc is an add-in in the traditional sense, attached via the Lotus add-in manager and called by means of Alt-function key combinations.

Once invoked, ForeCalc presents a series of menu commands that prompt for data, allow you to set options, and then extrapolate a specified number of data points. ForeCalc shows its findings—both the predictions and the statistical

measures of their validity—on its own screen and offers to write them onto your worksheet. If you wish, the program will also ask you for a blank portion of your worksheet on which to build a macro. The macro will display a simple Lotus line plot of your historical data, ForeCalc's extrapolation, and the upper and lower confidence levels for the predicted values.

ForeCalc's standard extrapolation methods include simple one-parameter, Holt two-parameter, and Winters three-parameter exponential smoothing. In its automatic mode, the program determines both the most suitable extrapolation method and the optimum smoothing parameters based on whatever best fits your data. If you like to make your own decisions, you may select additive rather

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The ill-fated "Rhapsody for Subsonic Tubas" was performed only once by Frederick Von Stuckman. The notes were so low, no one could hear them. Requests for encore performances were subsequently low.

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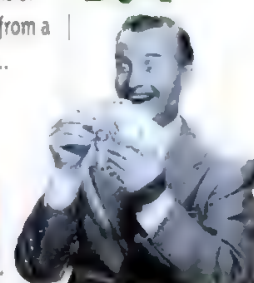
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486SX/25
"Honorable mention"
October 13, 1992

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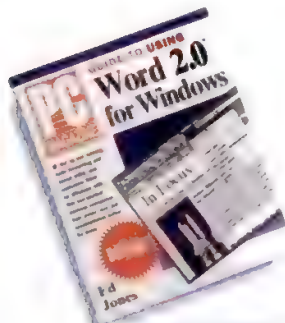
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CIRCLE 357 ON READER SERVICE CARD

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than multiplicative seasonality, specify a damped rather than a linear trend, and choose your own smoothing parameters.

ForeCalc is essentially bulletproof and tuned for quick results. If you are comfortable with ForeCalc's automatic methodology, or if you know enough about statistics to drive it manually, it's an ideal tool for basic time-series forecasting.

Forecast! takes a very different approach. Forecast! is an elaborate auto-executing macro, rather than a traditional add-in. (Because it relies on macro code, rather than the Lotus add-in manager, it can be used in Borland's Quattro Pro as well as in 1-2-3.) To run the program, you retrieve FORECAST.WK1, whereupon the macro's main menu prompts you for a data file and a range within that file. The program then imports your data via /File, Combine and begins to analyze. At your request, a subsequent routine will extract the predicted values, with accompanying statistics, to a new file.

But unlike ForeCalc, Forecast! is not bulletproof. Press ScrollLock or Ctrl-Break and the macro code is laid open for all to see, touch, and break (don't throw out that distribution disk!).

Overall, however, everything about the program's approach encourages you to explore, experiment, think about what the numbers mean, and feel secure in knowing you've chosen the most statistically valid forecasting options. The options themselves are far richer than they are in ForeCalc (for example, in Forecast! you can apply hyperbolic, s-curve, quadratic, and polynomial, as well as linear and exponential trends), and the manual is a miniature course in statistical forecasting.

Forecast! comes in separate versions for use with and without WYSIWYG. Either way, the program makes more extensive use of 1-2-3's graphics capability than ForeCalc manages.

Forecast! is more complex, more difficult to learn, and harder to use than ForeCalc. But for those whose needs are not basic, or for those who want to learn

something about what's going on inside the black box, Forecast! should be the tool of choice.

Business Forecast Systems Inc., 68 Leonard St., Belmont, MA 02178; 617-484-5050. List price: \$149.

Circle 534 on reader service card

Intex Solutions Inc., 35 Highland Circle, Needham, MA 02194; 617-449-6222. List price: \$165.

Circle 485 on reader service card

Baler Software Corp.

Ice

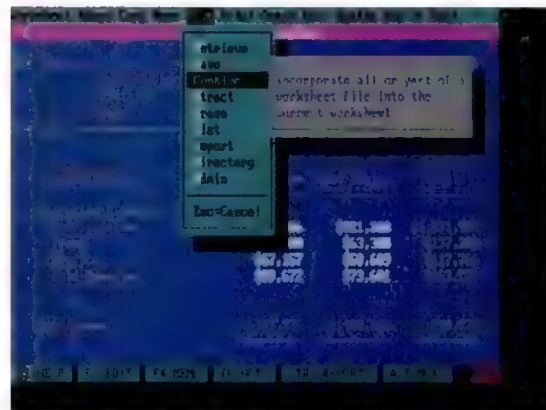
BY CRAIG STINSON

Baler Software Corp.'s Ice is an 80K add-in that supplies tools for developing custom macro-driven applications in Lotus

1-2-3. Unlike a true spreadsheet compiler (which Baler also supplies at twice the cost of Ice), Ice creates applications that still require a copy of 123.EXE to run. But the finished programs can be executed directly from the DOS command line.

Ice includes a runtime engine (which the developer may distribute freely) that executes the developer's custom sign-on screen, invokes 1-2-3, and interprets all

Works with:
• Lotus 1-2-3 for DOS 2.x



Baler Software Corp.'s Ice development tools helped turn Lotus 1-2-3 ring-style menus into drop-down menus. At the same time, some often-used features are now attached to function keys.

of the many nifty extensions that Ice supplies to the native 1-2-3 macro language.

Those extensions let you transform 1-2-3's menus into drop-downs or pull-ups, remove or disable particular native commands or menus, assign macros to

Now, other word processors have something they never had before.

Features	Ami Pro 3.0	Word for Windows 2.0b	WordPerfect for Windows 5.1
True WYSIWYG in all views eliminates guesswork	Yes	No	No
Fast Format – quick repetition of text formats	Yes	No	No
SmartMerge step-by-step mail merge guide with a card file data manager	Yes	No	No
Preview of professionally-designed Style Sheets for memos, faxes, letters, newsletters, etc.	Yes	No	No
WYSIWYG preview in File Open to quickly view, print, or extract text	Yes	No	No
Number of import/export filters (word processing, database, spreadsheet, graphics)	45	27	36
Grammar Checker	Yes	Yes	No
On-line Tutorial	Yes	Yes	No
Automatic re-numbering of lists	Yes	No	No
Colorful, customizable, editable, sizable SmartIcons™ for one click access to your most frequently used tasks	Yes	No	No
In-context editing of drawings and charts	Yes	No	No
Laptop Install option for quick and minimal configuration on a laptop	Yes	No	No
Clean Screen option for total workspace customization	Yes	Yes	No

Competition.

Take a look at this chart and you'll see, feature-by-feature, just how far Ami Pro® 3.0 has leaped ahead of other Windows™ word processors. Which, not surprisingly, is why it's being hailed as the best word processor for Windows by respected and objective evaluators.

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In fact, in recent tests† conducted by the National Software Testing Laboratories, Software Digest® (Vol. 9, No. 6, Sept. '92) gave Ami Pro 3.0 the highest Overall Evaluation in its category.

Their reason: "Lotus Ami Pro 3.0 offers an unbeatable combination of peerless usability, top-level features and fastest overall performance."

It also received the highest score ever for a Windows word processor in a recent InfoWorld® review, and won the PC Computing MVP award for word processing. So it's definitely the word processor to evaluate.

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Ami Pro 3.0. It's the one word processor for Windows that doesn't just invite comparison. It welcomes it.



Lotus Ami Pro 3.0 Word Processor for Windows

†Among Windows word processors tested. Reprints of report available upon request. *Offer expires 3/31/93. Call for a list of eligible word processors. Education-priced Lotus products not included. Offer valid in U.S.A. only. Not to be combined with any other offer. Please have your credit card and current word processor ready when you call. In Canada, call 1-800-GO-LOTUS. © 1992 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus and Ami Pro are registered trademarks and SmartIcons is a trademark of Lotus Development Corporation. Software Digest is a registered trademark of NSTL, Inc. InfoWorld is a registered trademark of InfoWorld Publishing, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. Adobe Type Manager and the ATM logo are registered trademarks, in the United States, of Adobe Systems, Inc.

CIRCLE 143 ON READER SERVICE CARD

From Your Friends In The Business...

Thank you for making 1992 the best year yet for everyone at Gateway 2000. Because of your belief in us, we captured an unprecedented five *Computer Shopper* 1992 Best Buy Awards including Best Overall Vendor.

And in *PC Computing's* 1992 MVP Awards, Gateway was honored with the MVP Desktop System Award for our 4DX2-66V system. Thank you *PC Computing*!

We're much obliged to *PC Magazine's* readers who gave us the best overall score in *PC Mag's* 1992 Service and Reliability Survey.

Our humble thanks to the readers of *PC World*. They honored us with two World Class Awards in 1992 – one for the Gateway 4DX-33 and another for Service and Support.

Our hats are off to *Compute* magazine for presenting us with 1992 Best Desktop Computer for the Gateway 4DX2-50.

We're thrilled that *Popular Science* magazine recognized the Gateway HandBook portable PC as one of 1992's "Best of What's New."

And thank you *BYTE* magazine for an Award of Distinction for the HandBook. *BYTE* readers also chose the Gateway 486DX as Desktop Computer of the Year.

Finally, we applaud all our loyal customers. Without your unwavering support throughout the years, Gateway couldn't have won these honors. We owe our success to you, and we'll be forever grateful. Here's to another great year in 1993!



What Do You **Wish** For In A PC?

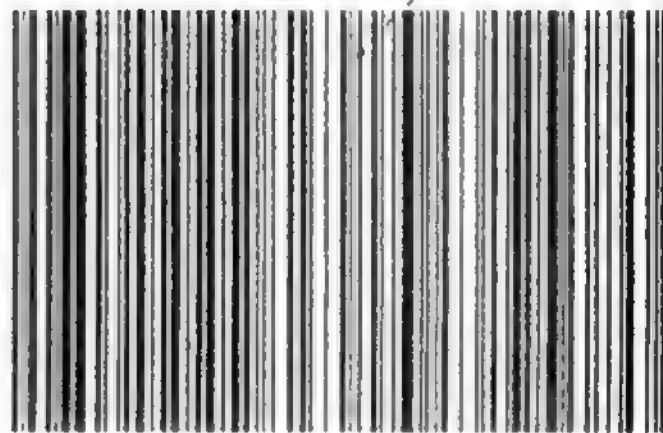




1. Follow instructions on the other side

Back

0018-0000-Back-0018



Inverted Back

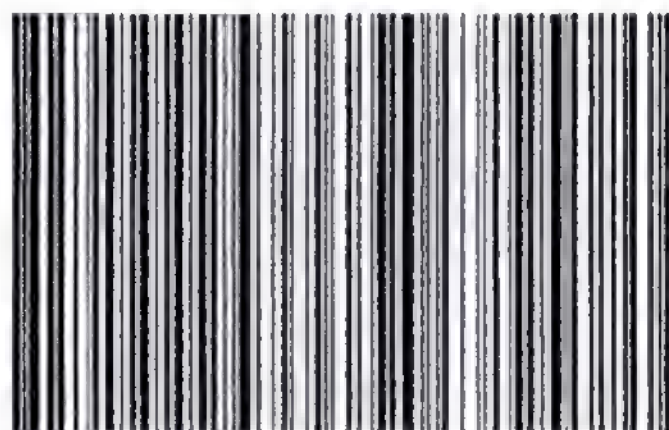
1. Follow instructions on the other side



1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

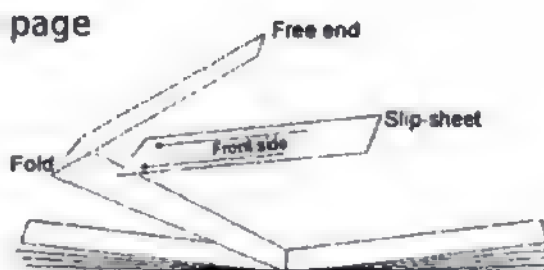
Foldout slip-sheet

Folded edge of the page



Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



Your Wish Is Our Command!



A magical scene with a glowing genie lamp in the foreground, emitting a bright light. A large plume of purple smoke rises from the right side of the frame. The background is a warm, orange-brown color with scattered colorful gems and small, glowing particles.

"I wish I could get a great PC
at a great price without sacrificing
performance and features."

"I wish I could be sure I'm
buying from a PC company that will
provide excellent service and support –
a company that will be around for me."

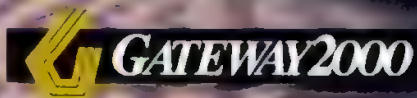
"I wish I could find the
combination of features I need in a
portable PC – at the right price."

Your wish is our command at

Gateway 2000! We can grant you the three most universal PC wishes in the wink of an eye. As a fringe benefit, we won't limit you to three wishes here. Most anything your heart desires in computers (sorry, we can't grant wishes for romance or riches), you can get from Gateway.

That's because we built our business by listening to our customers' wishes and doing everything in our power to make their dreams come true. At Gateway, we believe you should be able to *have it all*: the latest technology, glittering performance, quality construction, enchanting service and the fairest prices in the land. All this from a financially healthy company that won't run dry and leave you stranded in the desert.

You don't have to settle for less. With Gateway 2000, you can have it all. Draw up your wish list and give us a call. We'll make some truly magical values materialize for you.



Gateway Grants You The Most Wond

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You'll be spellbound by Gateway's ferociously competitive prices on systems



that are unequaled in powerful performance, impressive features and graceful integration of components. Other companies make the same claims, but the truth is revealed when readers and editors of the most popular PC magazines are asked which company delivers on its promises. Their overwhelming response is Gateway 2000.



"Gateway has gone far beyond conventional ideas of

price and performance. In doing so, it has created new rules that other PC makers will have to follow if they want to remain players."

— *PC Computing*, 1992 MVP Awards



"Gateway 2000 was the big 1992 Best Buy winner, sweeping not only the desktop awards as it did last year, but the newly expanded notebook categories as well ... Altogether, Gateway won five Best Buy awards this year, including Best Overall System Vendor ... It's no surprise that Gateway is consistently the people's choice when it comes to systems. Its formula for success is to sell fully configured PCs at aggressive, how-can-they-do-that prices, along with comprehensive service and technical support."

— *Computer Shopper*, 1992 Readers' Best Buy Awards

ous Value In The Land.



"Gateway not only captured the title for best desktop, it also got the nod for best service and support and ranked in the top five for portables, notebooks, most promising newcomer and best mail-order firm."

— PC World, 1992 Readers' Choice Awards



"I wish I could be sure I'm buying from a PC company that will provide excellent service and support — a company that will be around for me." Your wish is our command!

Twice in 1992, Gateway was honored for outstanding service. *PC World* readers ranked Gateway number one in service and support. And *PC Magazine* readers gave Gateway the best overall scores in the 1992 Service and Reliability Survey.

Just as important is our strength as a company. Warranties and assurances of lifetime technical support don't mean anything unless a company survives to honor them, which is a serious consideration in the shifting sands of today's PC marketplace.

Gateway is among the few financially robust companies in the industry. Our 1992 revenues exceeded \$1 billion and our earnings are among the strongest in the industry.

The company is virtually debt-free. At a time when other companies have been forced to lay off employees, we added 300 people to our staff.

You now have 1,800 friends in the business.

Rest assured Gateway is your oasis that will never leave you high and dry. We'll be here for you!



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For The Nomad In You.

"I wish I could find the combination of features I need in a portable PC - at the right price." Your wish is our command!

No matter what you need in a portable, you'll find it in one of our Nomad models or

in the Gateway HandBook.™ Gateway customers selected Nomads as the winners in 386 and 486 notebook categories of *Computer Shopper's* 1992 Best Buy Awards.

"There are faster laptops, there are cheaper laptops, there are color laptops, but there is no better laptop ... Weighing in at only 5.6 pounds, the Nomad combines the powerful punch of a 25MHz i486DX with a working battery life of more than six hours. At long last, we have a laptop

that can really go the distance when there's no power outlet in sight."

- *Computer Shopper*, 1992 Readers' Best Buy Awards

The Gateway 2000 HandBook is an enchanting, one-of-a-kind, real PC in miniature form! The HandBook, recognized by *Popular Science* magazine as one of the "Best of What's New" products of 1992, also received *BYTE* magazine's Award of Distinction.

PC Computing describes the HandBook as "an engineering marvel." *PC Week* agrees.

"Gateway's HandBook is just about as small as a fully functional portable can be.

Because the HandBook is powerful enough for most of my needs and fits comfortably in my briefcase, I now leave the computer bag at home."



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Cool Tools for DOS, a diagnostic and utilities package, comes with all Gateway desktop systems and includes:

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Windows for Workgroups is ideal for e-mail, group scheduling and resource sharing, and includes an Ethernet adapter and software. Plus the hardware and software is factory-installed. You can see Windows for Workgroups running on Gateway systems in any of over 200 Egghead Software® stores in the U.S. Stop by for a demonstration!

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This sound system designed especially for business use lets you speak to your PC for hands-free operation. It even reads numbers back to you for proofing. You can also embed audio messages in all your Windows OLE applications. Package includes soundboard, microphone, headset and software.

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Add color to your documents with this Panasonic KXP2123 24-pin dot matrix printer. Includes Adobe Type Manager.®

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*Contains an Intel386™ or Intel486™ microprocessor



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function keys and display a function-key menu across the bottom of the screen, create "drill-down" macros that run when a user selects a particular cell and presses Enter, supplement the 1-2-3 help system with custom help files, assign colors to various elements of the 1-2-3 display, remove the worksheet frame from the display, and a whole lot more. These features are implemented via 73 custom macro verbs, which can be incorporated into new or existing 1-2-3 macros.

Ice's applications don't run faster than native 1-2-3 programs, but they can do a great deal more. They can also be bulletproofed much more thoroughly. One hazard users should look out for: Ice doesn't get along well with WYSIWYG in graphics mode. It cooperates well when WYSIWYG is in character mode, however.

Baler Software Corp., 1400 Hicks Rd., Rolling Meadows, IL 60008; 708-506-9700. List price: \$395.

Circle 486 on reader service card

Funk Software Inc.

InWord

BY M. DAVID STONE

If you live in Lotus 1-2-3 and don't want to leave it to write the occasional memo or letter, or if you have a favorite word

Works with:

• Lotus 1-2-3 for DOS 2.x

processor that lacks an easy way to join worksheet data with word processing text, consider Funk

Software's \$99.95 InWord. This may be just the word processor you need.

InWord offers everything you would expect in any low-end word processor, including copy, move, erase, tab, and search-and-replace commands; the ability to retrieve, combine, save, and print documents; the ability to import and export ASCII files; and the ability to format for character, paragraph, and page. There's even a mail-merge feature included that uses a 1-2-3 worksheet as the data file.

Most important, the command structure fits together nicely, borrowing some commands from 1-2-3 (you tack down the beginning of a range by hitting a period,

for example) and combining them with commands that feel comfortable for word processing.

As you might expect, you can create hot links to a range in the current worksheet in order to automatically update data. You can also copy data to or from the worksheet. InWord lacks any way to embed worksheet graphics in your text, but you can get the same effect by copying the text to your worksheet and using 1-2-3's WYSIWYG add-in for formatting the final product.

Count this one as a terrific low-end word processor that also happens to be an add-in.

Funk Software Inc., 222 Third St., Cambridge, MA 02142; 800-822-3865, 617-497-6339. List price: \$99.95.

Circle 520 on reader service card

Personics Corp.

Macro Editor/Debugger

BY BEN Z. GOTTESMAN

Henry Ford once said of the Model T, "You can have any color you'd like, as long as its black." The Lotus 1-2-3

Works with:

• Lotus 1-2-3 for DOS 2.x

spreadsheet provides a similar range of options for debugging macros; you can run a macro at full speed, or you can single-step. Personics Corp.'s \$179.95 Macro Editor/Debugger changes all of that.

In addition to the Lotus 1-2-3 spreadsheet's two stepping modes, Macro Editor/Debugger lets you set breakpoints (pauses in the macro) and watchpoints (cells whose contents are monitored by the add-in). The spreadsheet add-in lets you run Macros one cell at a time, with each cell containing multiple commands.

When the 74K add-in is invoked, the screen splits into two parts. At the top of the screen, you see your Lotus 1-2-3 worksheet. In the bottom half, Macro Editor/Debugger shows you your macro on the left, while displaying your watchpoint values on the right. The program also provides you with easily understood descriptions of what it is doing. For example, if your macro contains a branch command, Macro Editor/Debugger will display, "The next step is shown below,

at cell x." You can also choose the View command, which will temporarily halt a macro, allowing you to move around with the spreadsheet.

As valuable as Macro Editor/Debugger is, users who need advanced debugging functionality may also want to consider moving to Quattro Pro. Borland's spreadsheet is compatible with most Lotus .WK1 worksheets and macros, and it provides many of the same macro editing capabilities as the Macro Editor/Debugger offers. In addition, you will most likely find the Quattro Pro competitive upgrade less expensive.

Personics Corp., 234 Ballardvale St., Wilmington, MA 01887; 800-445-3311, 508-658-0400. List price: \$179.95.

Circle 487 on reader service card

Funk Software Inc.

Noteworthy

BY M. DAVID STONE

Funk Software's \$79.95 Noteworthy is to Lotus 1-2-3 spreadsheets what Post-it notes are to paper: a way to fit in extra

Works with:

• Lotus 1-2-3 for DOS 2.x

information without defacing the original worksheet. To attach or read a note, you move to the appropriate

cell and call up Noteworthy. The program responds with a window that has room for 11 lines of about 40 characters each, but the window will scroll for longer notes, accommodating up to 8,000 characters. Noteworthy gives Lotus 1-2-3 spreadsheets a function somewhat similar to the Notes feature users have enjoyed in Microsoft Excel 4.0. However, Microsoft Excel 4.0 offers none of the editing abilities found in Noteworthy.

Noteworthy offers a remarkable array of conveniences, including a full set of editing commands. You can even search or replace through all notes in a worksheet. Other features let you transfer data between separate notes or between notes and the worksheet, as well as import a text file into notes. If you're not sure where the notes are, you can ask for a list or map that temporarily marks cells with notes attached.

Warning: Adding notes to Lotus 1-2-3 spreadsheets quickly becomes an

Applications Add-Ins

addictive habit. If you don't think you need Funk Software's Noteworthy, you probably haven't tried it.

Funk Software Inc., 222 Third St., Cambridge, MA 02142; 800-822-3865, 617-497-6339. List price: \$79.95.

Circle 488 on reader service card

Intex Solutions Inc.

PC Publishing Success

BY M. DAVID STONE

PC Publishing Success from Intex Solutions meets all the technical definitions of an add-in; it attaches to Lotus 1-2-3,

for example. But you can just as easily think of it as a full-fledged, \$159.95 presentation package that just happens to need 1-2-3 and WYSIWYG to run.

You can create individual slides with Success to serve as part of a slide show or to print on any printer supported by the WYSIWYG add-in. If you need to, you can export them to .BMP or .PCX format.

The program also gives you lots of tools for creating charts. Among these are tools for bulleted lists, organization charts, table charts, and free-form text. You can also add a worksheet range, a 1-2-3 graph, or an imported image to a slide and add—for example—an arrow, an ellipse, or a rectangle with the program's drawing tools. Once you've added a graphic object, you can change its size, shape, and rotation. You'll also find menus for creating interesting backgrounds; these menus include an option for a gradient backdrop. You can even add a previous slide as the background for a new slide.

Finally, you'll find a set of tools for controlling the presentation itself. You can, for example, set the on-screen time for each slide in tenths of a second and choose from an extensive list of effects for moving from one slide to the next, such as horizontal or vertical "wipes."

If 1-2-3 is a primary source for the data in your presentations, Success is an obvious choice for presentation software.

Intex Solutions Inc., 35 Highland Cir-

cle, Needham, MA 02194; 617-449-6222. List price: \$159.95.

Circle 490 on reader service card

Funk Software Inc.

P.D. Queue

BY M. DAVID STONE

Print control in Lotus 1-2-3 has always been pretty basic, if not primitive. Sure, Version 2.3 added background printing with BPRINT, but having to load a separate TSR is clumsy. Moreover, BPRINT is limited to spooling only, without any control over the print queue. If you yearn for something more sophisticated, take a look at Funk Software's \$89.95 P.D. Queue.

P.D. Queue offers background spooling, but that's the least of its benefits. Once P.D. Queue is installed so that 1-2-3 will load it automatically, you can largely ignore it. By default, it will spool anything printed from either 1-2-3 directly or the WYSIWYG add-in, freeing up your system considerably faster than it would take for the printer to finish.

This automatic loading and spooling is already an improvement on Version 2.3's BPRINT, but there's more. You can call up P.D. Queue at any time to see both the print queue (which can hold up to 99 print jobs) and the current status of each job. You can also kill print jobs, pause them, change their order in the queue, direct them to any port, tell P.D. Queue to keep the spooled files after printing so you can print them again later, set a number of copies to print, and so on.

You can even leave 1-2-3 and come back later to print. When you load 1-2-3 again, P.D. Queue will attach and remind you that there are still jobs in the queue. This is, in short, a full-featured spooler, and if you sometimes create files faster than you can print them, it is a much better choice than standing around waiting for your printer to finish.

Funk Software Inc., 222 Third St., Cambridge, MA 02142; 800-822-3865, 617-497-6339. List price: \$89.95.

Circle 489 on reader service card

Intex Solutions Inc.

Spellin!

BY M. DAVID STONE

It's been said that anyone who can't think of more than one way to spell a word can't have too good of an imagination. Maybe so, but consider what it does to your credibility to let spelling mistakes slip into your spreadsheets. Such a pitfall can be avoided with Spellin!, a \$125 offering from Intex Solutions.

There isn't much to say about Spellin!, other than it does just what you would expect it to. This is a straightforward spell-checker that includes both a 90,000-word U.S. dictionary and a 90,000-word British dictionary. You can use either one.

You can tell the program to check an entire worksheet or a defined range. It will stop at a suspect word, offer a number of possible corrections, and ask if you want to replace, edit, or ignore the word. It will also ask if you'd like the word added to your custom dictionary.

The program will flag consecutively repeated words, as well as sentences that don't begin with a capital letter. As a bonus, the program adds a search-and-replace feature to Lotus 1-2-3.

Quite simply, Spellin! works as advertised. If you ever enter anything besides numbers in your spreadsheets, this is a program you ought to have.

Intex Solutions Inc., 35 Highland Circle, Needham, MA 02194; 617-449-6222.

List price: \$125.

Circle 491 on reader service card

Symantec Corp.

SQZ!

BY BEN Z. GOTTESMAN

Symantec Corp.'s SQZ! does one thing—compression—and does it well. The

\$99 Lotus 1-2-3 add-in can shrink your spreadsheet files by as much as 90 percent.

Works with:

• Lotus 1-2-3 for DOS 2.x

• Lotus 1-2-3 for DOS 3.x

Works with:

• Lotus 1-2-3 for DOS 2.x

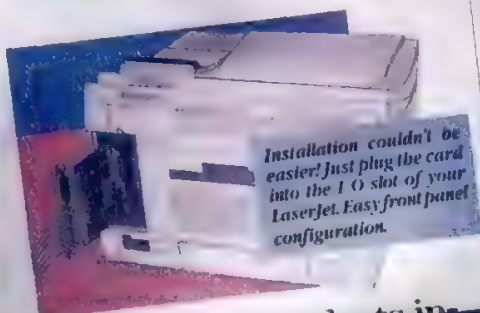
Works with:

• Lotus 1-2-3 for DOS 2.x

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Easy to use—includes all the cables, adapters, and software needed

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- Supports both PCs and Macintoshes



Pacific Connect Xi and the HP LaserJet

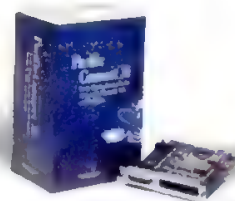
LaserJet Series II, IID, III, IIID		LaserJet 4 and IIIS ⁺	
5 port (4 serial, 1 parallel)	\$399	7 port (6 serial, 1 parallel)	\$599
10 port (10 serial)	\$599	10 port (10 serial)	\$699

* Also compatible with HP PaintJet[®] XL300 and DesignJet[®] plotter

SAN DIEGO—Pacific on the LaserJet II, IID. This includes the price

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CIRCLE 182 ON READER SERVICE CARD

Applications Add-Ins

The package includes versions of the program for 1-2-3, Releases 2.x and 3.1.

Once you load the 52K SQZ!, you can save files in the program's proprietary WK! (2.x) or W3! (3.1) file formats. Files are saved using the standard /File, Save command. SQZ! assumes that once you begin using the program, you will always want to compress your files. With SQZ! loaded, /File, Retrieve will only show you SQZ! files. You can retrieve WK1 and WK3 files by selecting Squeeze, Disable from the SQZ! menu.

A standalone utility program included with the product lets you perform batch compressions on your worksheet directory. The utility can also be used to recover corrupted SQZ! files. Users can freely distribute UNSQZ, which will decompress SQZ! files for 1-2-3 users who do not own the product.

As compact as SQZ! will make your files, it includes many options for making them even smaller. Whereas 1-2-3 saves both formulas and their resulting values, SQZ! lets you save just the formula and will remove formatted blank cells.

Symantec has not updated SQZ! since 1-2-3, Release 2.2, and the program consequently has a few incompatibilities with Release 2.4. For example, the add-in menus cannot be accessed with a mouse. More seriously, SQZ! lets you maintain a revision log including a user identification and notes, but if WYSIWYG is attached when SQZ! prompts you for your ID, your system will lock.

Borland bundles a special version of SQZ! with Quattro Pro.

Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408-253-9600. List price: \$99.

Circle 492 on reader service card

Frontline Systems

What-If Solver

BY CRAIG STINSON

The best spreadsheet programs these days come with advanced problem-solving modules called optimizers. These

let you reverse the normal what-if process—and more. Instead of changing a single input value and testing its impact on your

model, an optimizer lets you designate numerous input cells, as well as numerous constraints. The program then performs mathematical feats to determine what combination of inputs yields the best possible results on the bottom line. It will determine, for example, the most profitable balance of items in your product line given resource costs and availabilities.

Optimizers evaluate trade-offs. You can use them, for example, to find the least expensive way to deploy your staff—given work rules, wages, and expected customer traffic; to allocate an investment portfolio in a manner that maximizes profit potential while meeting safety requirements; and so on.

Lotus 1-2-3, Release 2.x, has no optimizer, but you can add one via Frontline Systems' \$199.95 What-If Solver. (This program is, in fact, functionally identical

The screenshot shows a spreadsheet application window titled "What-If Solver". It displays a table with columns for "Month", "Yield", "Term", "Purchase in month", and "Total Interest Earned". The table contains data for various months and yields, with a total interest earned of 6000. The interface includes a menu bar with options like "What-If Cell", "Constraint Cell", "Optimize Cell", "Table", "Settings", "Go", "New", and "Quit". A status bar at the bottom indicates "Table loaded: D11 F75".

Frontline System's What-If Solver helps extrapolate various scenarios, to arrive at the best result. Selecting the "Optimum Cell" option should help find maximum return on investment.

to the one built into Borland's spreadsheets and nearly the same as the one shipped with Excel.) To use What-If Solver, you create a standard .WK1 file, specify which cell you want to maximize or minimize, tell the add-in what cells it may vary and what constraints must be met, and issue a Go command. After the optimizer program arrives at a solution, you can press Enter to accept the optimal values or Esc to discard them. If the problem is unsolvable, the add-in supplies clear diagnostic messages.

What-If Solver is powerful, quick, and easy to use. If you are now juggling trade-offs by trial and error, this is a must-have add-in.

Frontline Systems Inc., P.O. Box 4288,

Incline Village, NV 89450; 702-831-0300. List price: \$199.95.

Circle 493 on reader service card

Funk Software Inc.

The Worksheet Utilities

BY M. DAVID STONE

Most Lotus 1-2-3 add-ins offer a tightly focused set of features that are of critical importance to a few users and largely irrelevant to most. In contrast, Funk Software's The Worksheet Utilities (\$149.95) offers wide-ranging features that should be of interest to anyone who uses 1-2-3. In fact, the package could well be described as a collection of features that Lotus Development Corp. should have built into 1-2-3 in the first place. Once you've seen them, you'll never use 1-2-3's /File menu again.

The Worksheet Utilities actually consists of two add-ins: CellWorks, which offers features for use within a worksheet, and FileWorks, which offers file management. You can attach either one without the other. FileWorks uses 110K RAM, or 55K if expanded memory is available. CellWorks uses 87K RAM, or 47K if expanded memory is available.

The CellWorks add-in includes an auto-save option that you can set to save every 1 to 999 minutes, a search-and-replace feature that will work for labels or formulas, and a formula editor that provides menu-based help for creating formulas and lets you see a lengthy formula all at once while editing it.

The file-management features are, quite simply, superb. Not only can you retrieve and save files, but you can also tag, copy, move, rename, delete, compress, decompress, add descriptive notes to, and even archive successive versions of a file. You can also change drives and directories (taking advantage of a visual representation of the directory tree), as well as create, delete, and rename directories.

Works with:

• Lotus 1-2-3 for DOS 2.x

Works with:

• Lotus 1-2-3 for DOS 2.x

• Lotus 1-2-3 for DOS 3.x



The drive and determination to advance can be seen in many forms. Here's a couple we think you'll be excited about.



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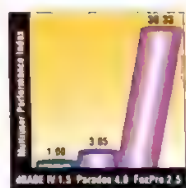


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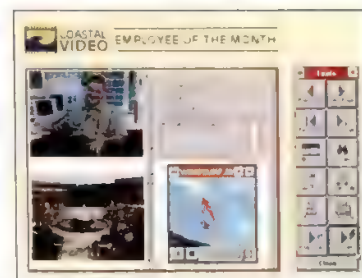
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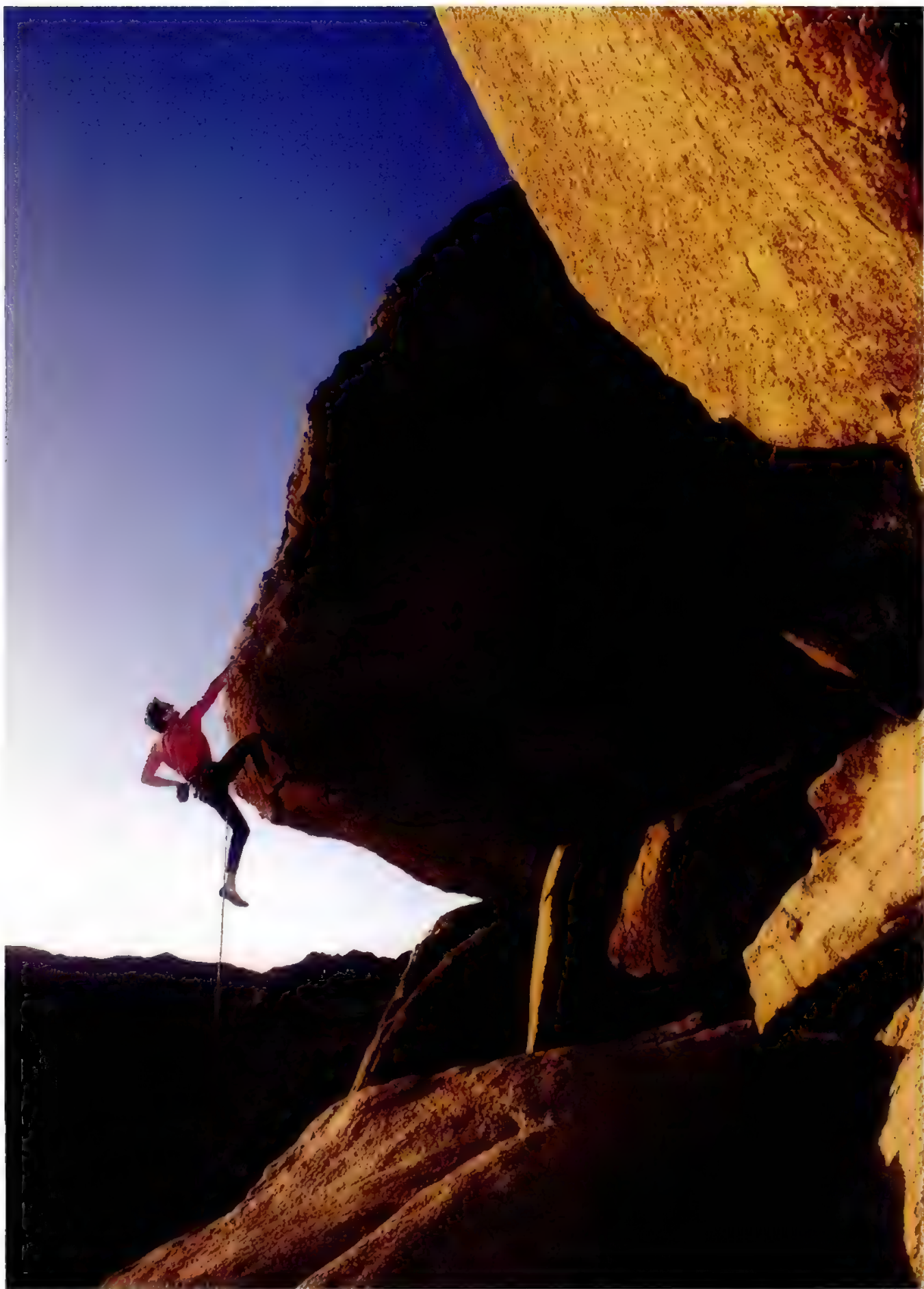
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For additional information, just zip on over to your nearest reseller, or call us at (800) 882-2000, Dept. JG2. We'll be more than happy to tell you all the ways Microsoft FoxPro 2.5 for Windows can get your adrenaline pumping.



FoxPro 2.5 takes advantage of Windows and allows you to create dazzling applications.

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There are also Cue Cards to walk you through the most difficult database tasks. Guiding you one step at a time.

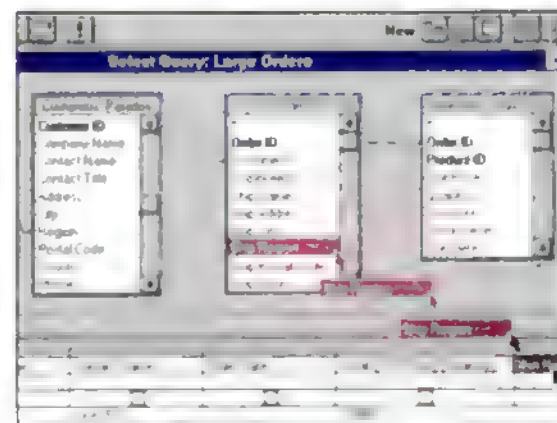
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To receive additional information on Microsoft Access, call (800) 882-2000, Dept. JG3. We'll give it to you straight.



Create complex queries visually with our graphical Query By Example.

Microsoft
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Applications Add-Ins

Sadly, the FileWorks function-key commands will not work if you have the WYSIWYG add-in attached, which means you can't view files or see the file descriptions conveniently. This is a mildly serious problem that, unfortunately, Funk Software has no immediate plans to fix. But even with this flaw,

FileWorks is very nearly the equivalent of having a DOS shell from within 1-2-3, and The Worksheet Utilities is well worth having.

Funk Software Inc., 222 Third St., Cambridge, MA 02142; 800-822-3865, 617-497-6339. List price: \$149.95.

Circle 495 on reader service card

Word Processor Add-Ins

Software Workshop Inc.

The Button Cube

BY EDWARD MENDELSON

WordPerfect for Windows includes a customizable strip of icons called the Button Bar that can appear on the edges of the

program's window. Software Workshop's \$89.95 add-in, The Button Cube, displays a cube of icon palettes,

with different sets of icons on each of four sides. A mouse click rotates the cube to display different sets of icons, and the icons themselves include shortcuts for functions and special characters that you won't find on WordPerfect for Windows' built-in icons.

The Button Cube needn't be a cube. It can look like a rectangular solid, a flat surface with icon palettes on both sides, or even a single palette such as the Smart-Icons in Lotus applications.

Unlike WordPerfect for Windows' Button Bar, The Button Cube displays icons only—no captions. If you can't recall an icon's function, move the mouse pointer over it and read the brief description that appears on WordPerfect for Windows' status bar. You build button cubes with a drag-and-drop menu that lets you search by name for buttons with the functions you're looking for. You can assign macros to any of a variety of icons.

Annoyingly, the cube is rebuilt from its configuration file each time you load WordPerfect for Windows—a process that can take 15 seconds or more on a fast machine. Depending on the complexity of

the cube, it can swallow up to 8 percent of system resources. But the package includes an uninstall program if you decide to do without it.

Software Workshop Inc., 170 S. Mountain Way Dr., #114, Orem, UT 84058; 800-762-9550, 801-224-6865. List price: \$89.95.

Circle 496 on reader service card

Streetwise Software

By Design for WordPerfect

BY EDWARD MENDELSON

By Design for WordPerfect transforms the DOS version of WordPerfect from a character-based word processor with

added graphic functions into an automated page-layout program, complete with predesigned borders, images, display fonts, logos, page-

numbering styles, and elaborate page layouts. Streetwise Software's \$99 add-in gives you an enormous toolkit of design elements that you can add to reports, letters, fax cover pages, mailing labels, and other documents large and small.

Unlike ordinary clip-art packages, By Design offers sophisticated images that usually won't embarrass you in public. Also, no other package of prepared layouts offers the same level of automation. A hotkey pops the program's drop-down menu over WordPerfect's editing screen. From the menu, you can select design elements to add to your text. You can enter your name and address and choose from about 50 supplied images to use for custom logos in some of the page layouts. A separate utility lets you add any WordPerfect graphic to the menu.

The six typefaces that come in the package aren't true fonts, but graphic images of each letter. You can't use them for ordinary typing, but they make effective graphic elements. Designs for purchase orders and invoices create tables that let you enter prices directly into documents, but in a format that makes it inconvenient to calculate totals.

By Design lets you create fancier WordPerfect documents than you ever thought possible. The package is technically impressive and easy to use, and its graphics can teach a plodding document to dance.

Streetwise Software, 2116 Wilshire Blvd., #230, Santa Monica, CA 90403; 800-743-6765, 310-829-7827. List price: \$99.

Circle 497 on reader service card

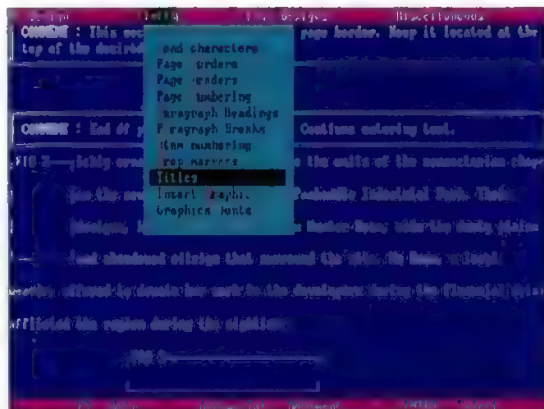
Streetwise Software

By Design for WordPerfect for Windows

BY EDWARD MENDELSON

By Design for WordPerfect for Windows does for the Windows version of WordPerfect everything that the original version of By Design does for the DOS version, and more. Like the DOS version, Streetwise Software's \$99 add-in provides professional-quality page layouts, images, logos, borders, graphic titles, and other features that the program automatically adds to your WordPerfect documents.

The program attaches itself to WordPerfect for Windows' control menu—the one you reach from the button at the up-



This DOS flavor of By Design for WordPerfect gives you instructions via menus and nonprinting comments. To see what a document looks like, you need to open WordPerfect's preview screen.

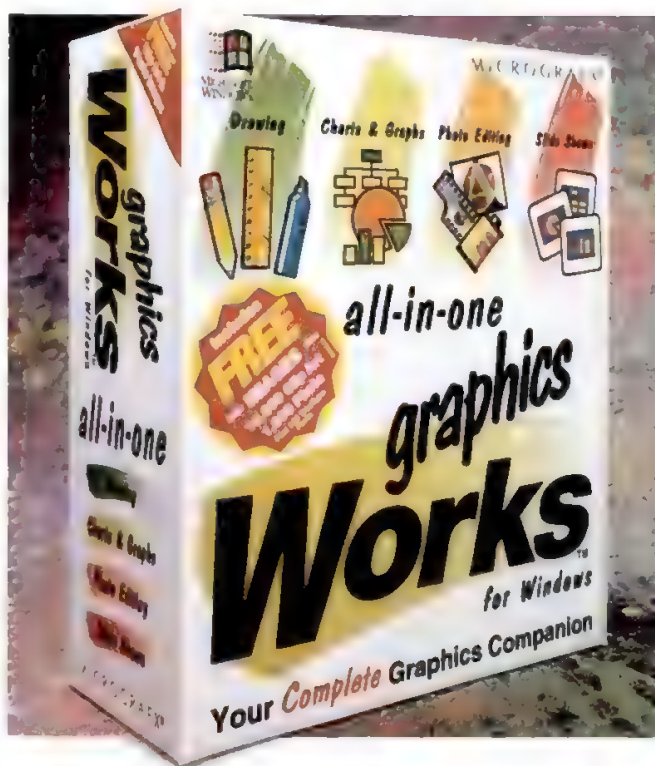
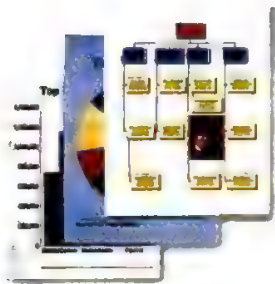
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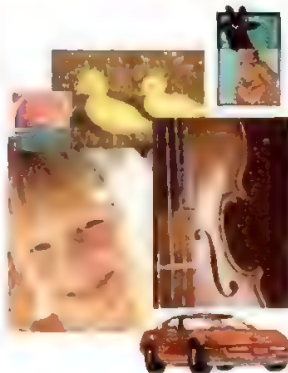
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CIRCLE 311 ON READER SERVICE CARD

■ Crossing Format Boundaries

by Edward Mendelson

Outside In for Windows opens your Microsoft Windows applications to virtually any kind of data file anywhere on your disk. This \$89 utility from Systems Compatibility Corp. allows you to view text, database, spreadsheet, and graphics files created by all common (and some uncommon) DOS or Windows applications, and then lets you import part or all of them into a Windows application, via the Windows Clipboard, keeping the basic formatting of the files intact.

You can start Outside In the way you start other separate Windows applications, or you can run it directly from the macro menus of Ami Pro, Word for Windows, or WordPerfect for Windows. Version 2.0, which PC Magazine Labs tested in a beta copy, also attaches itself to the menus of most Windows electronic mail programs and lets you view message attachments with their original formatting.

What makes Outside In so convenient is its ability to view files without opening the applications that created them. If you want to move a few cells from a spreadsheet into a word processor file, you simply select the file in Outside In's directory list, select the cells you want from the viewer screen, and paste them into your document with a few mouse clicks.

You can "tear off" the viewing window and leave it open or iconized on screen while you look at and tear off other files. You can also launch the application that created the file or print it without opening the application.

Version 2.0 includes viewers that allow you to look at the contents of .ZIP files. You can also view and import files from such non-Windows applications as dBASE, DisplayWrite, Manuscript, Paradox, and XyWrite. Like all file conversion programs, Outside In tends to get confused by complex page formats, but on the whole it works impressively well. A DOS-only version of Outside In operates as a TSR, and performs similar but less extensive functions than the Windows version.

Outside In won't help if you want

*What makes Outside
In so convenient
is its ability to view
files without opening
the applications
that created them.*

to convert a directory full of files at once, and you probably don't need the program if you convert files only rarely. Your best choice in either case is among three standalone file converters, Mastersoft's \$149 Word for Word Professional, Systems Compatibility Corp.'s \$149 Software Bridge, and WordPerfect Corp.'s \$49 ConvertPerfect. All are standalone DOS applications, although a Windows version of Word for Word Professional was announced as this issue went to press.

Word for Word Professional and Software Bridge have similar functions. Both let you choose one or more files and convert them in batch mode to any of dozens of formats, many of them obscure and rarely used. Each has different strengths and weaknesses in conversions, and if you have trouble with one, it's worth experimenting with the other. Word for Word Professional has a more intuitive interface, and includes a special disk to ease file transfers to the Macintosh.

ConvertPerfect provides essentially the same filters that come with WordPerfect for Windows. It handles fewer file formats than Word for Word or Software Bridge, and recognizes only outdated versions of Ami Pro and Word for Windows. But you may prefer it for its smooth conversions into WordPerfect format. □

ConvertPerfect

WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 800-526-5035, 801-225-5000. List price: \$49.

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Outside In for Windows

Systems Compatibility Corp., 401 N. Wabash, #600, Chicago, IL 60611; 800-333-1395, 312-329-0700. List price: \$89.

Circle 526 on reader service card

Software Bridge

Systems Compatibility Corp. List price: \$149.

Circle 527 on reader service card

Word for Word Professional

Mastersoft, 6991 E. Camelback Rd., #A320, Scottsdale, AZ 85251; 800-624-6107, 602-277-0900. List price: \$149.

Circle 528 on reader service card

per left of the window. It also installs itself on the WordPerfect Button Bar for quick access to its functions. You get the same features and graphics as in the DOS version (see the review of By Design for WordPerfect), plus additional options that let you highlight a block of text with borders or backgrounds or print a gray design as background for a page. The Windows version can generate separate

letterheads automatically for different users. The menus that let you select borders, graphics, and other features all include a miniature preview screen.

Graphics inserted by the add-in work like any other graphic element in WordPerfect for Windows. Unfortunately, that's where your problems begin. If you add a page border, WordPerfect for Windows redraws the entire border below the

cursor position every time you type a character. The delay and the distraction aren't the add-in's fault.

By Design for Windows does its job as well as WordPerfect for Windows allows, but you may find the DOS version easier to live with. If you insist on using the graphics conveniences of Microsoft Windows, consider waiting for a version of By Design that works with Microsoft

Applications Add-Ins

Word for Windows, due for release early in 1993.

Streetwise Software, 2116 Wilshire Blvd., #230, Santa Monica, CA 90403; 800-743-6765, 310-829-7827. List price: \$99.

Circle 498 on reader service card

WexTech Systems Inc.

Doc-To-Help

Blue Sky Software Corp.

RoboHelp

BY BARRY SIMON

Windows' Help engine remains one of its unsung gems. Each help file contains some words highlighted in green and underlined. These are Jumpwords: Whenever you click on one of them, the system jumps to a related topic. Windows Help also offers keyword searches, embedded graphics, and quick ways to return to previously viewed help screens.

In effect, Windows Help is the reader half of a wonderful hypertext application. Alas, the author half of the standard package is anything but wonderful. You need to prepare a source file for the Help

Word), building a WinWord add-in as a front end for creating help files is simple. There are two packages for creating WinWord help on the market; a third, Universal Help, was in beta testing at the time of this writing.

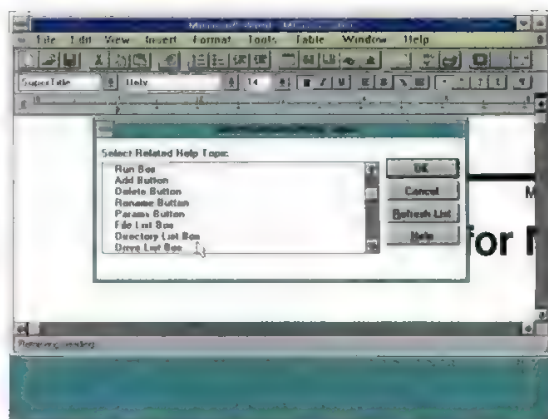
Doc-To-Help and RoboHelp use very different paradigms for the structure of help source code. With Doc-To-Help, the process is similar to that of producing a user manual using standard WinWord tools. For example, text regions that start with a heading2 style become Topics; index entries become Keywords. Topics can be grouped under heading1 style. WinWord will automatically generate a table of contents, which then acts as the help file's contents page. Bookmark cross-references become Jumpwords, and WinWord's outline tools can help you to organize your file. This makes it very simple to produce a manual and a help file simultaneously.

RoboHelp, on the other hand, uses files much closer to the format that the Help compiler requires. The cryptic footnotes are there, but RoboHelp provides you with menu choices that add help links without your needing to know the cryptic format and other choices that provide pop-up lists of existing topics to link to.

Both of the programs have macros that produce the needed .RTF and project files, launch the Help compiler, and produce a help file. Context mappings, needed to call context-sensitive help from within applications, can also be obtained with either product.

RoboHelp seems to assume that its users are programmers who already own the Help compiler; Doc-To-Help includes the compiler.

Since RoboHelp and the Help compiler use the same native format, it is easy to import existing help source code into RoboHelp, including all the links and keywords. Doc-To-Help can only import text, so RoboHelp is the obvious choice for those updating



Doc-To-Help, from WexTech Systems, will pop up a list of "jump" topics and help you turn a Microsoft Word for Windows document into a Windows-standard help file.

existing help systems.

Doc-To-Help, on the other hand, is the obvious choice for the corporate user who needs to update linked help and manuals often, say for an employee handbook. The downside is that Doc-To-Help needs to translate from its WinWord-based format to cryptic footnotes every time that you compile help. On a sample 30K help file with 60 topics on a 386/25, the process of translation, followed by compiling, took about 30 minutes; compiling in RoboHelp took about 5 minutes to do.

For those users who do not need to compile frequently, Doc-To-Help's greater use of WinWord tools gives it an edge.

WexTech Systems Inc., 310 Madison Ave., #905, New York, NY 10017; 212-949-9595. List price: \$295.

Circle 535 on reader service card

Blue Sky Software Corp., 7486 LaJolla Blvd., #3, LaJolla, CA 92037; 800-677-4946, 619-459-6365. List price: \$495.

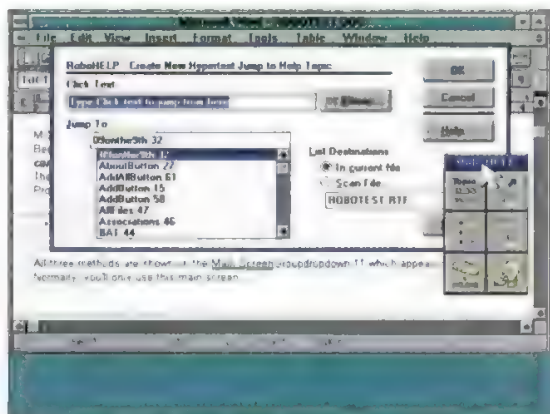
Circle 499 on reader service card

Advanced Software

DocuComp II

BY BARRY SIMON

DocuComp II is a DOS-based document-comparison utility that can be called from inside the Microsoft Word for Windows program. (WinWord). The package can compare ASCII and WordPerfect files as well as WinWord files.



Blue Sky Software Corp.'s RoboHelp lets you pop up a list of "jump" topics. Notice the RoboHelp toolbar in the corner of the Microsoft Word for Windows interface.

compiler in rich text format (.RTF). This is strictly work for programmers—and far from easy for them!

Since .RTF is the native format of Microsoft Word for Windows (Win-

Works with:

• Microsoft Word for Windows

Applications Add-Ins

WinWord includes its own Compare Versions command, but it works so poorly that one wonders whether its main reason for being is to earn check marks in magazine reviews. If two paragraphs in the current and comparison documents disagree by a single letter, Compare Versions marks the entire paragraph as revised—without flagging the change! If you then call up the Version Marks command and choose Accept Revisions, it wipes out your original paragraph totally. An add-in "patch" is necessary in this case to flesh out WinWord's feature set.

DocuComp replaces WinWord's Compare Versions with something that works a whole lot better. You pick an old version to compare with your current one and you give DocuComp a filename for a third—comparison—document. The macro then runs the DOS program (although if you closed your eyes, you wouldn't notice, since it returns you automatically to WinWord), and a single button push loads the comparison file. In the comparison document, words deleted

346-5392, 408-733-0745. List price: \$199.95. Five-station network server license, \$695.

Circle 500 on reader service card

Bitstream Inc.

FaceLift for WordPerfect

BY EDWARD MENDELSON

FaceLift for WordPerfect was the first high-quality font add-in for the DOS version of WordPerfect, and it is still one of

Works with:

• WordPerfect (DOS)

the most versatile. The \$99 utility, from Bitstream, lets you use any of the 200 scalable typefaces available in

Bitstream's Speedo format when printing to any HP-compatible laser printer—and just about any dot matrix model. It lets you use almost 500 characters in each font—more than any comparable application—and installs kerning-pair information.

FaceLift looks and works much like

LaserTools Corp.'s Fonts-on-the-Fly and PrimeType, partly because LaserTools wrote the program for Bitstream. It runs either as a shell around WordPerfect or as a TSR program, and it needs 14K of conventional RAM. It has no effect on WordPerfect for Windows; to use Speedo typefaces in Windows, buy Bitstream's \$99 FaceLift for Windows.

Like other font add-ins, FaceLift generates fonts inside your computer. With a fast machine, you'll get faster output than with your printer's

native fonts. It creates soft fonts for quick printing to HP LaserJets, but it creates images of the full page when printing to dot matrix models—an inevitably slower process.

Bitstream's Speedo format can't produce the same output quality as the Intellifont format used in Fonts-on-the-Fly or the Type 1 format used by PrimeType, but it takes a skilled eye to see the difference. Early in 1993, Bitstream plans to have

all the 1,100 typefaces in its library available in Speedo format, which means you'll have a wider range of designs than the tired-looking selection available now.

FaceLift for WordPerfect is a solid workhorse. If you need fast printing for any number of uses, this may be the only product that can give you exactly the output you need.

Bitstream Inc., 215 First St., Cambridge, MA 02142; 800-522-3668, 617-497-6222. List price: \$99.

Circle 501 on reader service card

Total System Solutions Inc.

Fileware

BY BARRY SIMON

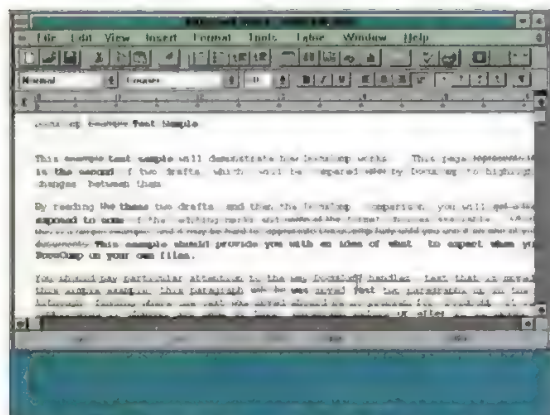
Fileware, a collection of Microsoft Word for Windows (WinWord) macros, installs a menu item that calls up a button menu of its 13 macros. You can also install these macros individually to menus or hotkeys.

Works with:

• Microsoft Word for Windows

Five of the macros give you basic file management: copy, move, delete, and rename files, and make directories. A sixth gives you a quick-launch menu for starting Windows apps. These have limited functionality. For example, the file management macros work on only one file at a time. The macros can't replace File Manager or Program Manager, but it is handy to have even this limited functionality easily available.

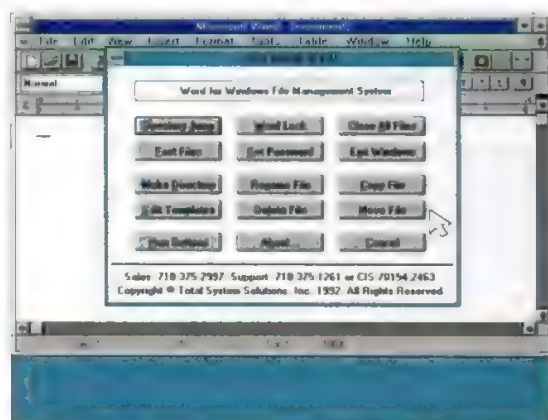
For many, the most interesting macros will be a pair that let you lock WinWord by setting a password. Once locked, WinWord remains open, but hidden off-



DocuComp II will compare Microsoft Word for Windows documents and mark them up using boldface, strikeouts, and underlining to indicate, now, deleted, and moved text, respectively.

from the old version appear as strikethrough text, added words appear in boldface, and moved paragraphs are underlined. You can use Search Revision Marks to locate all changes, but, alas, there is no automated way to accept changes in some places and revert to the original in others. Nor will the package locate font or format changes. While one hopes future versions will do more, DocuComp today does an excellent job of its basic function: comparing text.

Advanced Software, 1095 E. Duane Ave., #103, Sunnyvale, CA 94086; 800-



The menu provided with Total System Solutions' Fileware adds 14 macros to Microsoft Word for Windows. Among them are Close All Files and Set Password.

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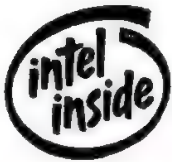
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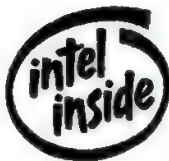
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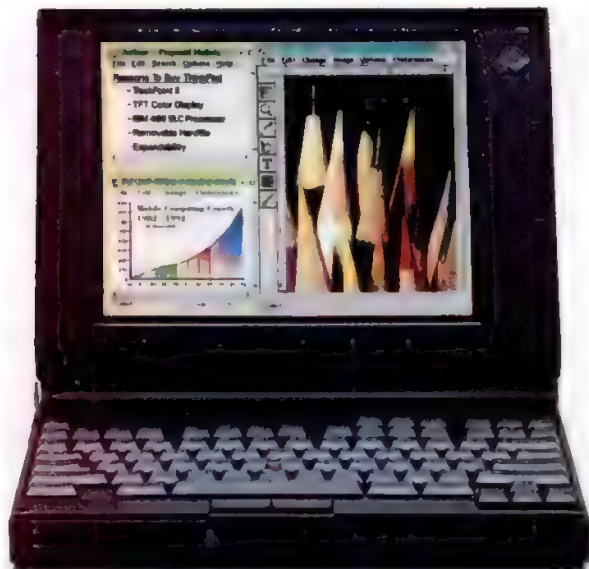


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[†] ThinkPad 300 and 700C systems and options are manufactured in Japan. PS/ValuePoint 6312, 6314 and 6319 Color Displays are manufactured in Korea.

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screen, with a blank document covering your work (in case prying eyes used Windows' Task Manager to move WinWord back on-screen). Until you type the correct password into the on-screen box, WinWord merely beeps in response to keyboard or mouse input.

These security macros mesh well with WinWord's ability to encrypt individual documents. That encryption is useless once you load the files into WinWord, but it provides protection if someone should reboot your machine to try to get around Fileware's protection.

The set is rounded out with CloseAll, Exit Windows, File Nickname, and Quick Change Directory macros.

Total System Solutions Inc., 1530 E. 18th St., #6H, Brooklyn, NY 11230; 718-375-2997. List price: \$39.95.

Circle 502 on reader service card

LaserTools Corp.

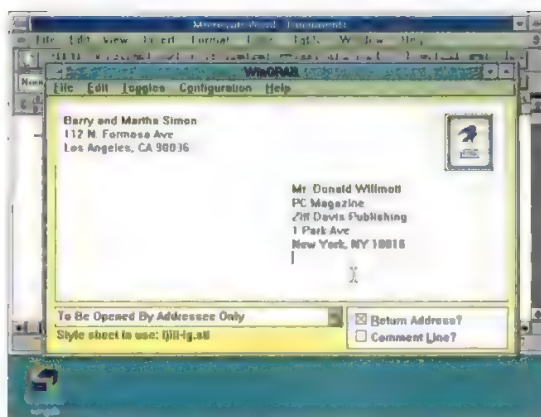
Fonts-on-the-Fly

BY EDWARD MENDELSON

Fonts-on-the-Fly allows any printer to produce the same output as the HP LaserJet III—but it lets you do it faster and better. LaserTools Corp.'s \$99.95 add-in for WordPerfect lets you use Intellifonts—the LaserJet III's native font format—with any HP-compatible laser and most dot matrix and ink jet printers.

Like other font add-ins, Fonts-on-the-Fly rasterizes fonts inside your computer. The 19 typefaces that come in the package include versions of CG Times that produce better output at small sizes than the versions that are built into the LaserJet III.

You can run Fonts-on-the-Fly as a shell around the DOS version of WordPerfect or as a TSR (terminate and stay resident) program that's always available when you run WordPerfect alone. It needs only 16K of conventional RAM. If you install it for use with WordPerfect for Windows, it lets you use the same Intellifont typefaces with WordPerfect printer drivers. Hewlett-Packard Co.'s free Intellifonts for Windows gives you matching screen fonts if you use the LaserJet III, but you'll have to live with non-



Grab Plus with Wingrab from ZPAY Payroll Systems has an elegant interface under Microsoft Word for Windows. Here, it works to automate the process of producing addressed envelopes.

WYSIWYG Windows screen fonts if you use any other printer.

Fonts-on-the-Fly adds speed to a LaserJet III, but its main value is that it adds scalable font support for earlier-model LaserJets and other HP-compatible printers, as well as dot matrix models. It installs kerning data from fonts that include them, and it can print about 350 characters with each font—more than PrimeType, fewer than FaceLift for WordPerfect.

LaserTools Corp., 1250 45th St., Emeryville, CA 94608; 800-767-8004, 510-420-8777. List price: \$99.95.

Circle 503 on reader service card

ZPAY Payroll Systems Inc.

Grab Plus with Wingrab

BY BARRY SIMON

Grab Plus with Wingrab is an economically priced collection of programs consisting of address databases linked to envelope- and label-printing miniapps for both DOS and Windows programs.

Its integration is tightest with Microsoft Word for Windows, where its macros search for an address in the current document, copy the address to the Clipboard, launch Wingrab (the envelope-printing component), and paste the address into an envelope.

To use Wingrab from any other program, you manually cut and paste or use Wingdb, the database component, which stores your names and addresses and calls

Wingrab automatically. DOS users can load Grab as a TSR or use Grabdb, the DOS database module.

The Windows programs are visually attractive. When Wingrab pops up, it looks exactly like an envelope on-screen, complete with a postage stamp! You can add a corporate or personal logo or envelope-handling notes such as *Air Mail*. You choose your printer and envelope size in "style sheets," with standard combinations provided. Up to two return addresses are stored in the style sheets as well.

To speed printing, Wingrab talks directly to the printer. Unfortunately, this means that you are limited to printer fonts, with Courier as the default. You can't use Adobe Type Manager or TrueType fonts, and to use other printer fonts, you'll need to use escape-code sequences.

Wingdb (which can import delimited data files) can quickly print out a batch of envelopes one by one, but it does not have automated mail-merge capability. If you need mail-merge in your envelope printer, check out Pinecliffe International's WOPR.

ZPAY Payroll Systems Inc., 2526 69th Ave. South, St. Petersburg, FL 33712; 800-468-4188, 813-866-8233. Available as shareware in CompuServe's MSWORD Forum as GRAB.ZIP, GRABDB.ZIP, and WINGRA.ZIP. Registration fee: \$49.95.

Circle 515 on reader service card

Guy Gallo

GToolbox

BY BARRY SIMON

Guy Gallo's GToolbox is a collection of 30 general-purpose macros for Microsoft Word for Windows 2.0 (WinWord) that should interest experienced users.

By default, WinWord stores all its document files in its program directory. Consequently, you'll need to do a lot of directory changing by hand in the Open and Save dialogs if you

Works with:

• Microsoft Word for Windows

Works with:

• Microsoft Word for Windows

■ Organizing Correspondence

by Barry Simon

Needle is to Haystack as *what* is to Computer? The answer, of course, is the letter you wrote six months ago. A secretary who produces only five letters a day will create about a thousand files in a work year. And long file names are no panacea if you can't remember if you called the file "Mr. Smith's inquiry" or "Mr. Smith's complaint."

Three add-ins help you cope with these issues: DocsDB organizes WinWord documents hierarchically. Office Accelerator, Version 2.0, is a Rolodex-style package with links to Delrina's WinFax Pro and the major Microsoft Windows word processors. And PRIME, Version 4.01, provides both document organization and preparation management.

DocsDB

This WinWord document-management system is designed with multiple users in mind, whether they be a group of network users or several managers sharing the services of one secretary. Its top-level organizational entities—called folders—are actually directories.

The subcategories within folders are called *clients*; clients are subdivided by *subject*. You can assign subjects on a client-by-client basis; you can even change the term *client*, if another seems more appropriate.

DocsDB installs replacements for File Save and File Open, which force

you to classify documents according to this client/subject scheme when you save them, allowing you to search by classification or by document title when you open them.

DocsDB has no built-in keyword search, but it piles all active files in each folder into a single directory so WinWord's Keyword/FileFind handles this easily. A nice touch is that it lets you break each client/subject category into active and archival documents.

Overall, DocsDB is a pricey but functional product that will help you track your WinWord files.

OFFICE ACCELERATOR

Office Accelerator changes WinWord's Window menu to "Accelerator/Window" and adds eleven menu items of its own. Among them are PhoneBook, Quick Letter, Quick Label, Quick Envelope, Quick Form and Quick Fax, Create/Edit Format, and Multiple Items.

The PhoneBook is a fast, standalone Windows application that can feed data to WinWord (via DDE, WinWord mail merge, and the clipboard). In addition to name, address, and phone, PhoneBook's data records have room for key words, notes, and distribution lists (named subsets of the database).

All of Accelerator's Quick menu choices call up the PhoneBook and let you choose a recipient and a format of the appropriate type (for example, let-

ter or label). The package then returns you to WinWord with the appropriate document template loaded and the name, address, and so on, properly filled in. You can add formatting, boilerplate text, and the like to formats by using the Create/Edit option.

With the Multiple Item menu option, you can pick a distribution list and produce a document in WinWord using WinWord's mail merge. Office Accelerator implements the concept of WinWord templates in a way that will be clearer to many users—and provides data links to boot, making it a powerful document assembly system.

PRIME

PRIME is a collection of macros that links WinWord to Polaris Software's PIM PackRat via DDE, and optionally to SofNet's FaxWorks (formerly Faxit). It has four main components: Document Management, Document Assembly, PackRat Data Search, and Fax Connection.

The Document Management feature replaces WinWord's File Open, New, Save, and Save As commands and has two organizational elements. First, it helps you store files associated with particular WinWord templates in different directories. File New gives you a button menu of templates and changes to the directory that you set for that template.

Second, and more significantly, PackRat's File Facility is used to store

want to store documents associated with different projects in different directories. GToolbox's Change Directory macro lets you specify a list of directories by nickname and allows you to switch to them via buttons in a dialog box prior to File-Open or FileNew. (Fileware and MasterWord both ape this GToolbox macro.)

GToolbox's CopyMacro and ManageMacros both copy macros between different WinWord document templates—which lets you make a template-specific macro into a global one (or vice versa)

or use it as a building block for a new template. While not as elegant as MasterWord's Template Manager, these provide much of the same functionality.

WinWord restricts what key combinations you can assign to macros. For example, Shift-key combinations can't include the Alt key, nor can you use keys such as the gray Plus key or the 5 on the numeric keypad. Unique to GToolbox is a macro that allows you to assign other WinWord macros to almost any key combination.

Other GToolbox macros let you change footnotes into annotations and vice versa, change typewriter quotes to publisher's quotes, print noncontiguous page ranges, and cascade open document windows. This is a rich collection for serious WinWord users.

Guy Gallo, 219 E. 69th St., New York, NY 10021; CIS 71171,3555. Available as shareware in CompuServe's MSWORD Forum as GTBX10.EXE. Registration fee: \$39.95; with disk, \$44.95.

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Applications Add-Ins

information about each file. When you save a file, you get a chance to log it into PackRat without leaving WinWord. You can later search in PackRat or via PRIME's File Open. The Notes in the PackRat entry store the file's history.

Document Assembly allows you to store boilerplate text on PackRat's index cards for easy retrieval by means of keyword searches. (While useful, this solution pales in comparison to Office Accelerator's.)

You can also access PackRat name-and-address data directly from within WinWord. Type in a name, highlight it, and call the right macro (via WinWord hotkey or menu choice), and magically, the full name and address is filled in from PackRat's database.

The fax link asks for a name, looks it up in PackRat, grabs the fax number and sends the current document and number to FaxWorks. □

DocsDB

Pro JV Consultants, 3013 Yale Ave., Marina del Rey, CA 90292; 310-827-8786; fax, 310-305-8918. List price: \$69.95.

Circle 529 on reader service card

Office Accelerator, Version 2.0

Baseline Data Systems, 3625 Del Amo Blvd., #245, Torrance, CA 90503; 310-214-8528; fax, 310-214-8529. List price: \$129.

Circle 530 on reader service card

PRIME, Version 4.01

PRIME Consulting Group, 2629 Manhattan Ave., #273, Hermosa Beach, CA 90254; 310-318-5212; fax, 310-798-2360. List price: \$49.95.

Circle 531 on reader service card

Alki Software Corp.

MasterWord

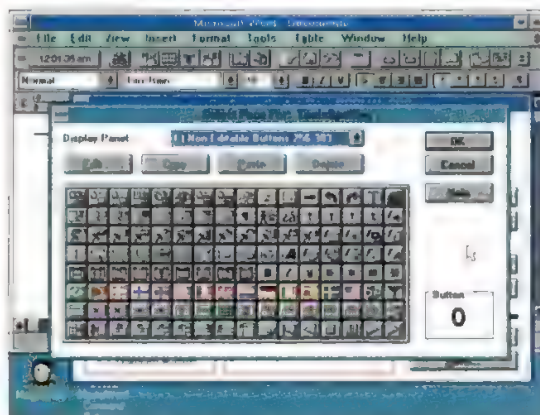
BY BARRY SIMON

MasterWord is a wonderful collection of macros and add-in programs for Microsoft Word for Windows 2.0 (WinWord) that offers something for everyone, from the novice to the most so-

phisticated user. Some elements, most notably the extra toolbar and the improved help system, apply to a broad spectrum of users. Template Manager is for power users and the iconic Template Selector for the less experienced.

Alki Software Corp. actually created WinWord's standard 1.8MB help file; Microsoft Corp. merely licenses it. With MasterWord's 2.7MB replacement, Alki expands the help facility, improves its organization, and adds several new goodies, such as a Related Topics button that pops up a list that remains open and available while you browse through its entries. You can also adjust the level of information from beginner to advanced.

MasterWord lets you add color to the toolbars—both WinWord's and Alki's custom one. You can load the custom toolbar to float vertically or horizontally or tack it down and replace WinWord's (a button lets you toggle between the two). You can even set up multiple cus-



MasterWord from Alki Software Corp. has its own button bar to add to Microsoft Word for Windows, and it comes with oodles of buttons to use with it.

tom toolbars for quick access to lots of functionality.

WinWord templates are a highly useful feature that may not be easily grasped by the uninitiated. MasterWord's Template Selector makes them more accessible by organizing them into groups and providing icon buttons to access them by.

Template Manager lets you display macros, styles, or glossaries from different templates and copy or move them from one to another like building blocks.

While we haven't covered all of the product's features, it should be clear by now that MasterWord is a powerful tool for a wide spectrum of WinWord users.

Alki Software Corp., 300 Queen Anne Ave. North, #410, Seattle, WA 98109; 800-669-9673, 206-286-2600. List price: \$99.

Circle 506 on reader service card

Design Science Inc.

MathType

BY BARRY SIMON

Design Science's MathType program is a Microsoft Windows-based WYSIWYG mathematical-equation formatter for people who want more than the solid capabilities that are already offered by the three major Windows word processors. Because OLE (Object Linking and Embedding) and TrueType naturally enhance such a program, you will want to use it with Windows, Version 3.1. We looked at Math-

Type 3.0—the first version to use these Windows 3.1 features—in a frozen-code version just before it was sent to manufacturing.

If you have used the Microsoft Word for Windows equation editor, you are already familiar with much of MathType, since it is, in fact, a licensed subset of MathType. Like that editor, MathType's menu bar has two ribbons below it. One pops up palettes of special symbols, the other pops up palettes of templates. (In this context, a template is a symbol with placeholders—for example, an

integral sign with places for limits and integrand.)

Two additional icon strips let you place frequently used symbols and templates with a single click. You can even place symbols from nondefault fonts collections, such as Lucida Math, included in the Microsoft TrueType Font Pack for Windows. Another ribbon enables you to place entire formulas with a single click. Finally, you can place a ruler, which is essential for accurate equation alignment.

Among the other useful features are the ability to keep a MathType server running so that it does not have to be re-

Works with:

- Ami Pro
- Microsoft Excel
- Microsoft Word for Windows
- WordPerfect for Windows

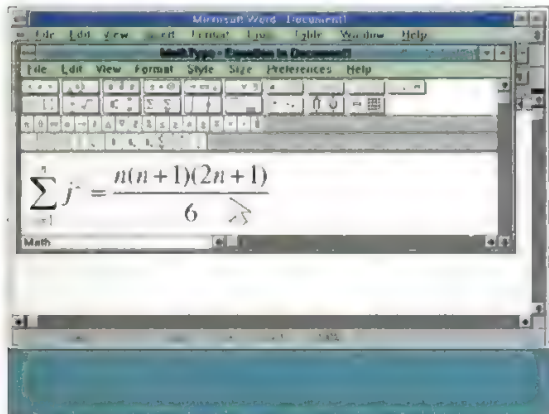
Works with:

- Microsoft Word for Windows

Applications Add-Ins

loaded for each new equation and the ability to export equations to TeX for typesetting. Heavy-duty equation consumers will probably want to invest in this product.

Design Science Inc., 4028 Broad-



With MathType, from Design Science, you can easily format complex equations in Microsoft Word for Windows using Object Linking and Embedding (OLE).

way, Long Beach, CA 90803; 800-827-0685, 310-433-0685. List price: \$199; \$89 for owners of Microsoft Word for Windows 2.0.

Circle 507 on reader service card

Michael H. Shacter

MPE4WP

BY EDWARD MENDELSON

If you can guess that MPE4WP stands for Macro Programming Environment for WordPerfect, then you will understand Michael H. Shacter's add-in product. With MPE4WP, you write macros in the normal text-editing screen of WordPerfect for DOS instead of WordPerfect's built-in macro editor or the editor program in WordPerfect Office.

The add-in consists of a keyboard layout and two small executable programs that you normally run from inside WordPerfect. You use the keyboard layout to create a text file that looks like a macro as seen in WordPerfect's macro editor. Special keys and menus let you insert macro commands, record keystrokes, add macro descriptions, construct full-screen menus, and devise other complex macro functions.

At the press of a key, one of the sup-

plied executable programs converts the text file into a working macro. The second program converts macros into text files that you can edit on-screen.

One advantage of MPE4WP over WordPerfect's built-in macro editor is that you can use all of WordPerfect's editing features, such as search-and-replace. Unlike the editor in WordPerfect Office, MPE4WP lets you record WordPerfect keystrokes while seeing their functions performed on-screen. Advanced macro programmers will appreciate its automated detection of the values needed to use WordPerfect's STATE and SYSTEM commands.

CompuServe's WPUSERS Forum, Library 16, has comparable but less ambitious macro-writing tools, notably Onik Arian's free TOOLS.COM, which is a keyboard layout that inserts macro commands directly into WordPerfect's macro editor. Also look for Michael Shacter's MALT (\$15), a TSR (terminate and stay resident) program that adds 90 single-keystroke macros to WordPerfect. But start with MPE4WP to eliminate the drudgery and awkwardness of macro programming.

Michael H. Shacter, 10309 Parkwood Dr., Kensington, MD 20895-4041; 301-530-6982. Available as shareware in PC MagNet's Utilities/Tips Forum, Library 16. Registration fee: \$20; with disk, \$25. Circle 508 on reader service card

LaserTools Corp.

PrimeType

BY EDWARD MENDELSON

Whatever typeface you want to use, you can probably find it in the Type 1 font format used by PostScript printers. If it is in Type 1 format, PrimeType, from LaserTools Corp., allows you to use it with WordPerfect and just about any non-PostScript printer. This \$99.95 font add-in product works with WordPerfect for DOS as Adobe Type Manager works with Windows: It steps in when you print

and translates Type 1 fonts into soft fonts that print on IBM and HP-compatible laser printers, as well as almost all dot matrix and ink jet printers.

PrimeType is invisible except in the second or two it needs to load. Like other WordPerfect font add-ins, it has no effect on the print preview screen. It runs as a shell around WordPerfect for DOS or as a TSR, and it needs only 16K of conventional RAM.

You can also install PrimeType into WordPerfect for Windows, where it lets WordPerfect's printer drivers use PostScript fonts with non-PostScript printers. Adobe Type Manager for Windows, which is included in the package, gives you WYSIWYG screen fonts when you use PrimeType-installed WordPerfect printer drivers with WordPerfect for Windows.

With a 386-based PC or better, PrimeType works faster than your printer's built-in fonts, and the 20 Adobe fonts in the package give you better output quality than you get from almost all of the non-PostScript printers on the market, complete with kerning pairs. In terms of speed, quality, convenience, and range of installable typefaces, LaserTools' PrimeType ranks as the best font add-in ever made.

LaserTools Corp., 1250 45th St., Emeryville, CA 94608; 800-767-8004, 510-420-8777. List price: \$99.95.

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Stairway Software

ScreenExtender for WordPerfect

BY EDWARD MENDELSON

WordPerfect for DOS is the only major character-based word processor that makes you scroll beyond the right edge of the screen to see the end of a long line. Stairway Software's \$99.95 add-in, ScreenExtender for WordPerfect, wraps itself around WordPerfect and installs screen fonts that squeeze up to 133 characters per line and as many as 60 lines of text on a single screen. It works with any graphic standard from Hercules and CGA up to Super VGA, as well as with 600-by-400 gas-plasma laptop displays.

Works with:

• WordPerfect (DOS)

Michael H. Shacter's add-in product. With MPE4WP, you write macros in the normal text-editing screen of

Works with:

• WordPerfect (DOS)

Works with:

• WordPerfect (DOS)
• WordPerfect for Windows

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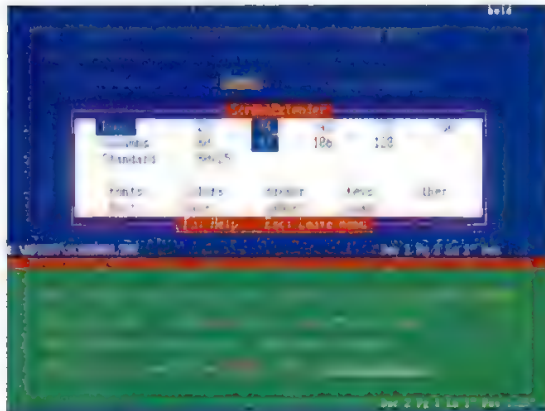
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ScreenExtender's screen fonts also display many of WordPerfect's text attributes. Italic text appears sloped, strike-out text is struck out, underlined and double-underlined text have the right number of underlines, and small capitals look like small capitals. Text with WordPerfect's "large" attribute looks properly large, and superscripts and subscripts are where they belong.

But an add-in product that loads special text fonts isn't as powerful as a graphical user interface. Unlike Windows, ScreenExtender won't imitate attribute combinations such as bold italic, which instead appears as a colored version of the normal font.

You load ScreenExtender from a batch file that then runs WordPerfect. The program normally uses about 58K of conventional RAM, but you can reduce this by disabling some font sizes. A hotkey pops up an awkwardly designed menu for choosing font styles, colors, and



ScreenExtender displays most WordPerfect text attributes in an approximately realistic style. So bold text will be bolder than regular text, and italic will really have a slant.

other options, and another hotkey restores your normal display mode. You can use the UltraVision screen enhancer font, from Personics Corp., in place of your video adapter's built-in normal mode.

ScreenExtender's fonts are not as well designed as standard IBM VGA fonts are. They are more than adequate, however, and they let you see your full text without having to lean on the Right Arrow key.

Stairway Software, 700 Harris St., #204, Charlottesville, VA 22903; 800-782-4792, 804-977-7770. List price: \$99.95.
Circle 510 on reader service card

Enhancement Software

StampIt

BY EDWARD MENDELSON

StampIt lets you print out your WordPerfect documents with the computer equivalent of traditional rubber-stamp

messages on them. Enhancement Software's \$89.95 package consists of a macro that lets you select one of 60 supplied images;

most come in hollow, shaded, and solid versions. The stamps include messages such as "Top Secret," "Exhibit—," and "Rush." Separate macros in the package give you the same effects in WordPerfect 5.1 for DOS or WordPerfect 5.x for Windows.

When you're ready to print out your document, you run StampIt instead of going to the print menu. A pop-up menu offers a list of designs for you to choose from; you can select one stamp for the first two copies and a different stamp for the next three copies of the document. You can also print stamps on selected pages.

Enhancement Software's StampIt offers no way to save your document in stamped form; you still have to select a stamp when you print. On the other hand, you can import the supplied images into your document's page headers and avoid using the macro again.

Anyone with a little macro programming experience can probably figure out how to add new stamps to the menu, but it's easier to order custom stamps from Enhancement Software at \$13.95 each.

If you need to stamp "Top Secret" on an important WordPerfect document today and put "Urgent" on another document tomorrow, Enhancement Software's StampIt will perform both jobs automatically and effortlessly.

Enhancement Software, 10960 Wilshire Blvd., #334, Los Angeles, CA 90024; 800-869-1122, 213-850-1362. List price: \$89.95.

Circle 511 on reader service card

Inherit The Earth Technologies

SuperScript Pro

BY EDWARD MENDELSON

Anyone who wants to use the DOS version of WordPerfect for writing scripts for screen, television, or stage needs SuperScript Pro. This \$159 set of macros from Inherit The Earth Technologies isn't nearly as meek as its company's name implies.

The macros are dazzlingly effective at giving you automated control over the exacting format standards for different types of scriptwriting. And they're aggressively eager to save you work. Once you enter the name of a character, for example, you need only type its first letter to enter it again.

Most rival script-formatting software works only after you finish working in your word processor. SuperScript Pro lets you write, format, and revise entirely within WordPerfect.

SuperScript Pro's macros combine intelligent automation with prompts and full-screen menus that perfectly imitate WordPerfect's own menus, so you don't have to readjust to different interfaces.

And you can customize every detail of formatting and menu choices. For example, you can tell the program whether to allow a page break in the middle of a paragraph of dialogue or stage direction, and you can specify how to renumber revised or inserted pages.

Everything in the package is accessed via a single keyboard layout, which supplies templates for screenplays and scripts for both television shows and stage plays. You can also use the package to reformat scripts imported in ASCII format.

The closest competition for the SuperScript Pro program is Guy Gallo's \$75 shareware GSCRIPT package for Word for Windows (available on CompuServe's MSWORD forum), which offers collapsible outlining. But for character-based scriptwriting, no other package even comes close to SuperScript Pro.

Inherit The Earth Technologies, 1800



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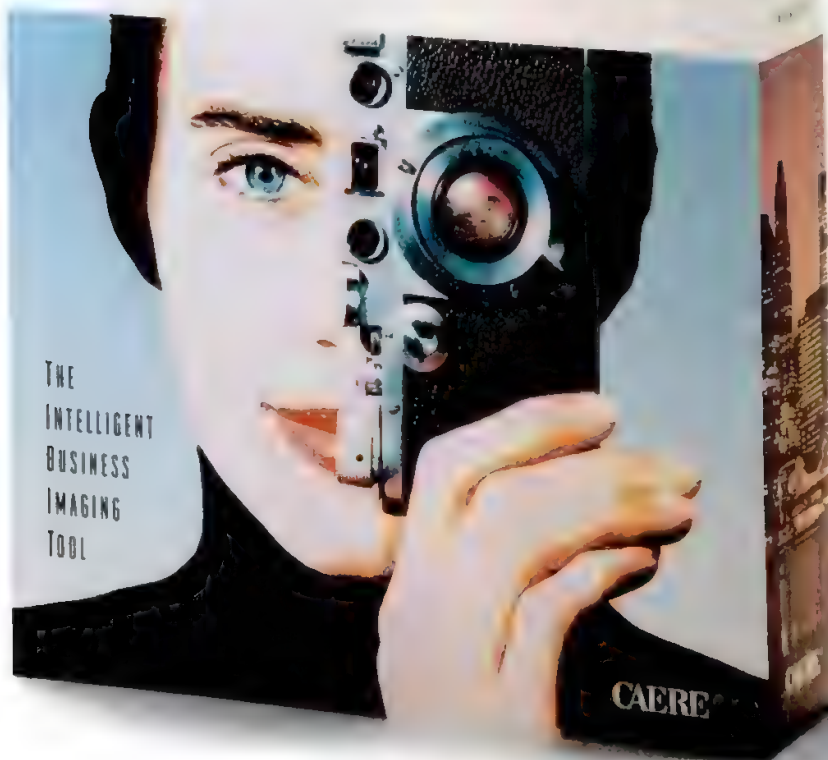
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140 Ways to Add In Productivity *by Brad Grimes*

Below is a list of the 140 spreadsheet and word processing add-in products we used to cull our roster of the 48 best from the add-in world. They run the gamut from product spruce-ups that provide the functionality you'd expect your core application software to build in to vertical enhancements that help you use your software to master new tasks. You'll also find add-ins that bring spit and polish in the form of templates, fonts, and other riches.

A number of companies, like Lotus and WordPerfect, maintain huge directories of third-party enhancements to their products. Affinity Publishing

publishes and updates two catalogs of add-ins that Microsoft Corp. ships with Excel and Word for Windows. And there are several companies, such as Intex Solutions, that collect and develop add-ins or market other companies' add-ins in a catalog along with their own. Heizer Software and Village Software market a variety of add-ins for Excel and Lotus 1-2-3, respectively, that were developed by professionals in fields such as financial management and statistics.

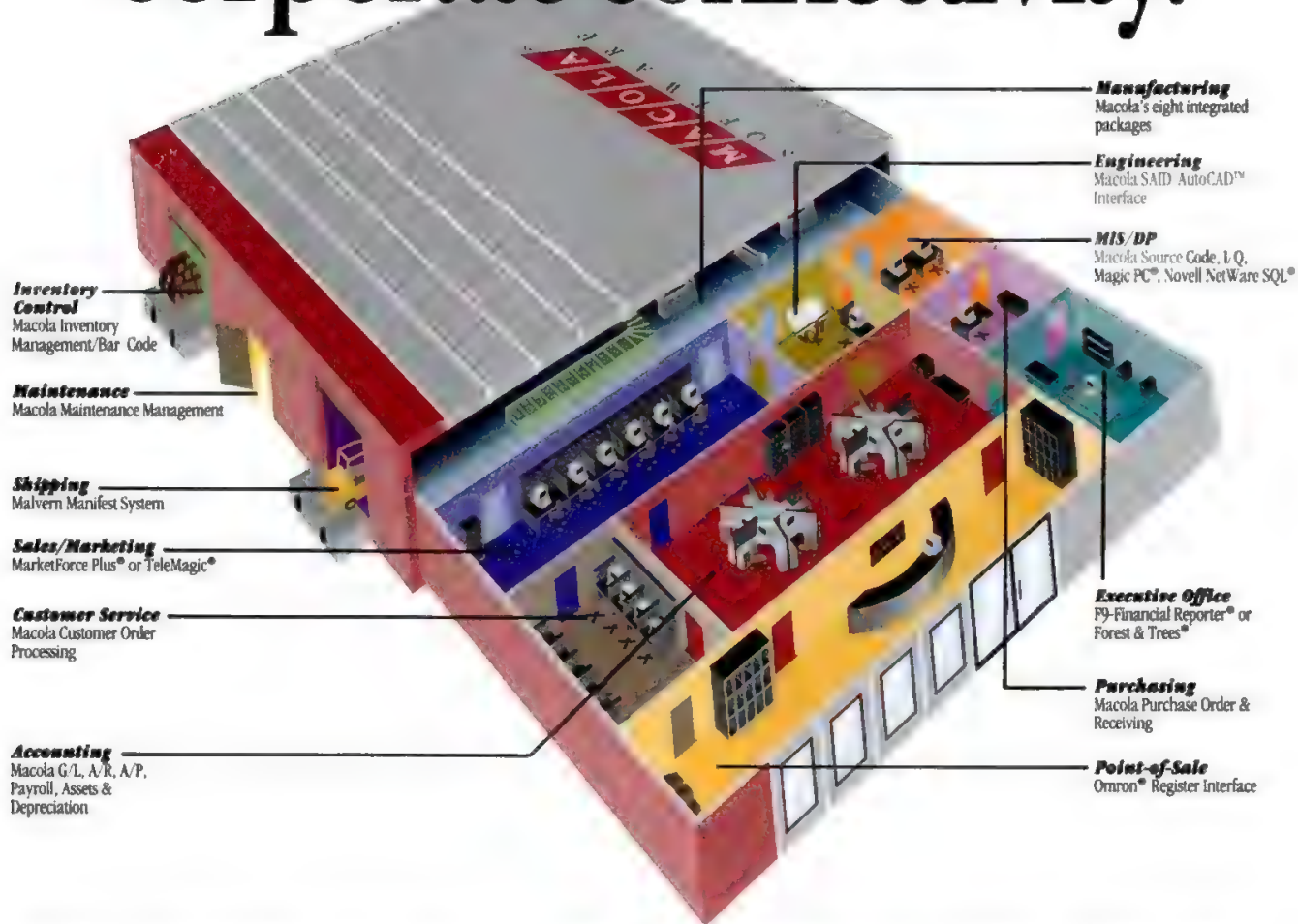
As you read through this chart you'll discover many ways to pump productivity into your word processing and spreadsheet endeavors.

Product	List price	Company	Works with*	Description
Spreadsheet Add-Ins				
Advanced Total Investor	\$99.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3	A portfolio management system that tracks capital gains, securities, and transactions and charts stocks. With a separate module (\$19), users can link to market information on CompuServe, GENie, and Prodigy.
@Base	\$195.00	Personics Corp. (508-658-0040)	Excel, 1-2-3, Symphony	An add-in database manager that uses dBASE file formats.
@Base Option Pac	\$99.95			A collection of extensions for managing large data files.
@Fixed_Income	\$795.00	Spreadsheet Solutions (516-222-1429)	1-2-3, Symphony	A specialized library of 44 @functions designed for fixed-income securities calculations and portfolio management.
@Functions #3	\$95.00	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	65 additional @functions, including calendar, date and time, external lookup, financial, logical, and string @functions.
The @Library—General Applications	\$79.95	Greymatter International (617-876-6969)	1-2-3, Symphony	Includes 48 @functions for finances, statistics, and other applications.
The @Library—Scientific and Engineering Applications	\$79.95			Includes 45 @functions for calculations that involve Bessel functions, hyperbolic functions, and vector multiplication.
The @Library—Statistical Applications	\$79.95			Supports standard statistical calculations such as means, medians, and modes, as well as probability distributions and significance tests.
@Options	\$395.00	Montgomery Investment Group (707-795-5373)	1-2-3	Calculations for traders and risk managers. Analyzes virtually any underlying asset. Modules are also available for "exotic" and over-the-counter options.
@Project/Graph	\$149.00	Convergics Corp. (619-689-2433)	1-2-3, Symphony	Two packages that jointly provide complete project management in 1-2-3. Users can build and manipulate schedules, compute earliest and latest start and finish dates, schedule resources, and plot and print Gantt or PERT charts.
@Project/Resources	\$249.00			
@RISK	\$395.00	Palisade Corp. (800-432-7475, 607-277-8000)	Excel, 1-2-3, Symphony	Risk analysis for Excel and 1-2-3. Users can view the results of thousands of "what if" scenarios. Results are plotted graphically with detailed statistics.
@Stats	\$295.00	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	44 specialized @functions for math and statistics, including factorial, interpolation, mean, mode, standard deviation, and variance.
Beyond Breakeven	\$289.00	Spreadware (800-793-4561, 619-347-2365)	Excel	Designed to take advantage of Excel 4.0's Scenario Manager; analyzes profitability and cost in business spreadsheets.
Bond @analyst	\$249.00	Tech Hackers Inc. (212-344-9500)	Excel, 1-2-3, Quattro Pro, Symphony	Basic @functions to supplement built-in spreadsheet functions. Calculates accrued interest, futures, price, yield, and more.
Braincel	\$249.00	Promised Land Technologies Inc. (800-243-1806, 203-562-7335)	Excel, 1-2-3 for Windows	Adds neural network forecasting to Excel spreadsheets for automatic analysis and forecasting. Users can create expert systems that can be updated in real time.
The Budget Express	\$149.00	Symantec Corp. (800-441-7234, 408-253-9600)	1-2-3	Tailors 1-2-3 for budgets, plans, and other time-related spreadsheets. Spreadsheet Outlining allows collapsing rows and columns to produce summary reports.
Business Plan Toolkit	\$149.95	Palo Alto Software Inc. (800-229-7526, 415-325-3190)	Excel, 1-2-3	Uses spreadsheet models to create balance sheets, cash flow analyses, income statements, personnel plans, sales forecasts, and more. Provides graphics.
Commando	\$49.95	Black Mountain Software (800-895-6865, 619-672-9850)	Excel 3.0	Provides a floating icon palette for Excel 3.0. (Version 4.0 has incorporated an icon palette.)
Cost Allocation	\$69.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3	A fully automated, menu-driven cost-accounting aid that allocates costs to departments, products, or projects, based on factors such as head count, percentages, or total costs.
CPA Tickler	\$89.00	Front Row Systems (404-231-0349)	1-2-3	A menu-driven due-date monitoring system that tracks upcoming events such as contract expirations, meetings, project deadlines, and tax returns. Prints reports or index/Rolodex cards.
Crystal Ball	\$195.00	Decisioneering Inc. (800-289-2550, 303-292-2291)	Excel	"What if" analysis tool that recalculates spreadsheets and then reports highest, lowest, and most likely results and the probability of each. Possible results are also plotted graphically.
Data Analyst	\$65.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3	Performs statistical analysis and linear regressions. Helps build statistical models and creates detailed reports that include mean, standard deviation, summation, and more.
D.A.V.E.	\$99.95	Goldata Computer Services Inc. (800-969-9440, 215-896-9440)	1-2-3, Symphony	Allows users to build custom data entry screens with varying edit criteria and validation checking.
Evolver	\$695.00	Arcelis Inc. (206-632-0885)	Excel	Uses a genetic algorithm to solve budgeting, resource distribution, and scheduling problems, as well as to suggest chemical configurations and baseball lineups.

* Contact vendors for questions of compatibility with specific versions of spreadsheets or word processors.

CONTINUES

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Accounting Software
You'll Never Outgrow



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SOFTWARE
Applications Add-Ins

Product	List price	Company	Works with*	Description
Spreadsheet Add-Ins (continued)				
Excel Reporter	\$199.00	Zen Software Inc. (203-268-6015)	Excel	A simple way to produce forms, mailing labels, and reports from Excel data. Creates groupings and subtotals and can set up relations among multiple spreadsheets.
Expert Ease	\$69.95	Black Mountain Software (800-995-6865, 619-672-9850)	Excel	A collection of add-ins, including tools to simplify file retrieval, print multiple worksheets, perform a statistical analysis on a selected range, and query a database.
Financial @nalyt	\$195.00	Tech Hackers Inc. (212-344-9500)	Excel, 1-2-3, Quattro Pro, Symphony	Basic @functions to supplement built-in spreadsheet functions; cash flow analysis for unevenly spaced cash flows, multiple rates, and other variables.
Financial @nalyt ValuePack	\$49.95	Borland International Inc. (800-331-0877, 408-438-8400)	Quattro Pro	45 @functions to perform financial calculations, including amortization and annuity and cash flow analysis, numerical conversions, and general mathematics.
Financial Templates for Small Business	\$69.95	PSI Research (503-471-3621)	1-2-3	Workbooks plus software: 35 worksheet templates that cover business plans, loan packages, purchases or sales of a business, and venture capital proposals.
Financial Toolkit	\$199.95	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	20 financial @functions that support loans and leases with variable interest rates and variable payment streams, second mortgages, new depreciation methods, and more.
FinCalc	\$99.95	Spreadsheet Solutions Co. (800-634-8509, 516-222-1429)	1-2-3, Symphony	A template that emulates time value of money and discounted cash flow analysis functions.
ForeCalc	\$149.00	Business Forecast Systems Inc. (617-484-5050)	1-2-3, Symphony	Statistical forecasting add-in that performs time-series and regression analysis. Forecasts are displayed with confidence limits. Users can create graphs and view diagnostics.
Forecast!	\$145.00	Intex Solutions Inc. (617-449-6222)	1-2-3, Quattro Pro, Symphony	Macro-driven time-series and regression analysis. Includes confidence and prediction intervals, filtering, seasonal adjustments, and smoothing. Automatically generates graphs.
Forms For You!	\$29.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3	Form templates that include a daily schedule, an expense report, a fax cover sheet, an internal memo, a phone list, a status report, and a to-do list. Forms can be printed or filled in on-screen.
Forms-To-Go!	\$129.95	Intex Solutions Inc. (617-449-6222)	1-2-3, 1-2-3 for Windows, Quattro Pro, Quattro Pro for Windows, Symphony	50 ready-to-use form templates for jobs such as accounting, purchasing, and tax preparation. In some cases the package requires Allways, Impress, or WYSIWYG add-ins.
Ice	\$395.00	Baler Software Corp. (800-327-6108, 708-506-9700)	1-2-3	Supplies tools for developing custom macro-driven applications. Can create drop-down menus, a function-key menu, and macros that run when the user hits the Enter key on a certain cell.
Inventory Analyst	\$245.00	Intex Solutions Inc. (617-449-6222)	Excel, 1-2-3, 1-2-3 for Windows, Quattro Pro	Plans inventory requirements. Users can graphically analyze monthly or weekly demands and automatically compute anticipated usage, order points, and order quantities.
InWord	\$99.95	Funk Software Inc. (800-822-3865, 617-497-6339)	1-2-3	Add-in word processor that links spreadsheet data to text. Includes commands for copying, erasing, moving, search-and-replace, tab settings, and more; also includes mail-merge.
Ko-Pilot for 1-2-3	\$89.95	Insight Resource Inc. (914-332-1589)	1-2-3	Offers menu-driven, task-oriented help for 1-2-3. Guides users step by step through processes such as formatting cells.
Look & Link	\$99.95	Personics Corp. (508-658-0040)	1-2-3	Allows users to browse one worksheet while working in another. Users can cut and paste between the worksheets and link information. The package also performs automatic worksheet consolidation.
Macro Editor/Debugger	\$179.95	Personics Corp. (508-658-0040)	1-2-3	Provides an interactive environment for creating and debugging macros. Built-in editor tracks comments, labels, and macros in separate windows.
Macromania for 1-2-3	\$59.95	Infosource Inc. (800-622-2995, 407-677-0300)	1-2-3	100 macros, shortcuts, templates, and worksheets.
MathPack for 1-2-3	\$99.00	Workhorses Inc. (800-777-2477, 303-279-8551)	1-2-3	Allows 1-2-3 to handle feet, fractions, inches, linear approximations, and medians. Also includes 20 @functions for English-to-metric conversions and vice versa.
Microsoft Excel Macros Step By Step	\$34.95	Microsoft Press (800-677-7377)	Excel	Primarily a book on how to program Excel macros. Also includes sample macros, such as a client-tracking system that manages mail lists, generates invoices, and produces reports.
Microsoft Open EIS Pak	\$99.00	Microsoft Corp. (800-426-9400, 206-882-8080)	Excel	Generates applications to build an "enterprise information system." Creates views that end users will see, such as Excel tables and charts, and custom menus and buttons to access views.
Monologue Monologue for Windows	\$149.00 \$149.00	First Byte (800-556-6141, 310-793-0600)	Excel, 1-2-3, 1-2-3 for Windows, Quattro Pro, Word, Word for Windows, WordPerfect, WordPerfect for Windows	Converts text to speech for easy proofreading of spreadsheets or text documents. No hardware or speech training is required. Select a block of text or a column of numbers and Monologue reads the data back.
Monte Carlo Plus	\$99.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3, Symphony	Performs sensitivity and risk analysis. The sensitivity module determines which variable is most important to the outcome of a calculation.
Notebook Template Collection	\$49.95	Borland International Inc. (800-331-0877, 408-438-8400)	Quattro Pro for Windows	25 business templates, including balance sheet and invoice; 25 time-planner templates, including appointment; and 25 investment templates, including cash flow and household finance.

* Contact vendors for questions of compatibility with specific versions of spreadsheets or word processors.

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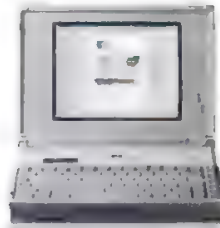
First SL notebook.



First Microsoft peer-to-peer notebook.



First upgradable-to-color notebook.



First notebook pre-loaded with
network client shells.



**We'd also be the first to
compare ourselves to our peers.
If we had any.**

You may be surprised to learn Zenith Data Systems is one of the world's biggest names in SL notebooks. Equally surprising is that we're #1 in the U.S. in SL based portables!!

Maybe we're first in sales because we're first in technology. Zenith Data Systems created the first SL notebook. We're the first peer to peer notebook, first up-

gradable to color notebook and first with pre-loaded network client shells.



Now being #1 doesn't mean diddily if we don't deliver. But we're satisfying thousands by offering Z•NOTES of uncompromising quality, with ultra-low Z•DIRECT prices, with unstinting customer assistance and unrivaled Z•CARE service.

So since you're shopping, we invite comparisons. Only Z•NOTE



comes with built-in networking with Ethernet-compatible, high-speed communication pipes for LAN connectivity. Only

While our competitors have been busy yelling, we've been busy selling. Guess who's #1 in SL portables?!!

The Z•NOTE



**\$1999
Z•DIRECT.
No ups,
no add-ons
no extras.**

Z•NOTE is pre-installed with client software for all three leading network systems—Novell, Microsoft and Banyan. Only Z•NOTE

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1993



could be the first to pre-install Microsoft Windows for Workgroups. Only Z•NOTE exclusively uses Intel 386SL microproces-

sors. The Z•NOTE has an active matrix color display. The Z•NOTE comes with MS-DOS and Microsoft Windows fully loaded and ready to run, right out of the box.

And only Z•NOTE has the low Z•DIRECT price without additional or hidden charges. Those other guys will charge up to \$500 on extras to match Z•NOTE features, and you still won't

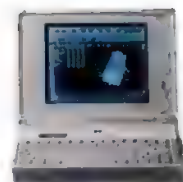
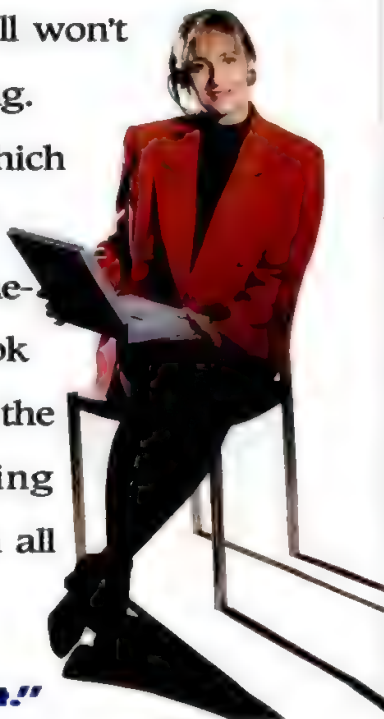
Sandy Blagojev, Z•DIRECT Account Executive. **"You can spend up to \$500 over quote and still not get networking from these other guys."** get networking. So, which will you buy? A johnny-come-lately notebook

from one of them. With none of the above. Or an award-winning Z•NOTE from Z•DIRECT. With all of the above.

"Prices change rapidly. Call for our latest and lowest."



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Z•NOTE™ 325L

"Built-in networking"

- Intel® 25 MHz i386™SL upgradable to i486™
- 4MB RAM user expandable to 12MB
- 85MB hard disk drive with MS-DOS® 5.0, Microsoft® Windows™ 3.1 and Microsoft Windows for Workgroups™ pre-installed
- Logitech® TrackMan® Portable mouse
- 9.5" black-on-white LCD, upgradable to active matrix color, 640 x 480 VGA with support for 64 grey shades, and simultaneous video support
- 3.5" 1.44MB floppy disk drive
- 8.5" x 11.9" x 1.9" only 5.9 pounds
- Rapid-charge nickel metal-hydrate battery for up to 4 hours* continuous use or up to 10 hours* under Rest/Resume condition
- Pre-installed network client software for Novell® NetWare, Microsoft LAN Manager, Banyan VINES®
- Ethernet-compatible high-speed communication port for LAN connectivity
- 82-key keyboard with 12 full-size function keys

New Lower Price

\$1999

Save \$400



Z•NOTE 325Lc

"Incredible color and price"

- Intel 25 MHz i386SL upgradable to i486
- 4MB RAM, user expandable to 12MB
- 120MB hard disk drive
- MS-DOS 5.0, Microsoft Windows 3.1 and Microsoft Windows for Workgroups pre-installed
- Logitech TrackMan portable mouse
- 8.4" active matrix color VGA LCD, simultaneous video support
- 3.5" 1.44MB floppy disk drive
- 8.5" x 11.9" x 2.1" only 6.5 pounds
- Rapid-charge nickel metal-hydrate battery for up to 2.5 hours* continuous use or up to 6.5 hours* under Rest/Resume condition
- Pre-installed network client software for Novell NetWare, Microsoft LAN Manager, Banyan VINES
- Ethernet-compatible high-speed communication port for LAN connectivity
- Optional READYDESK™ Port Replicator (\$107)

New Lower Price

\$3499

Save \$500

*Battery life depends on application used, power management features selected and peripherals attached

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**Call Z-DIRECT
for the first
flyweight
heavyweight.**

Chances are, what those new lightweight subnotebooks you're considering are light on are features and functionality. Especially if you use Microsoft Windows. So it's a



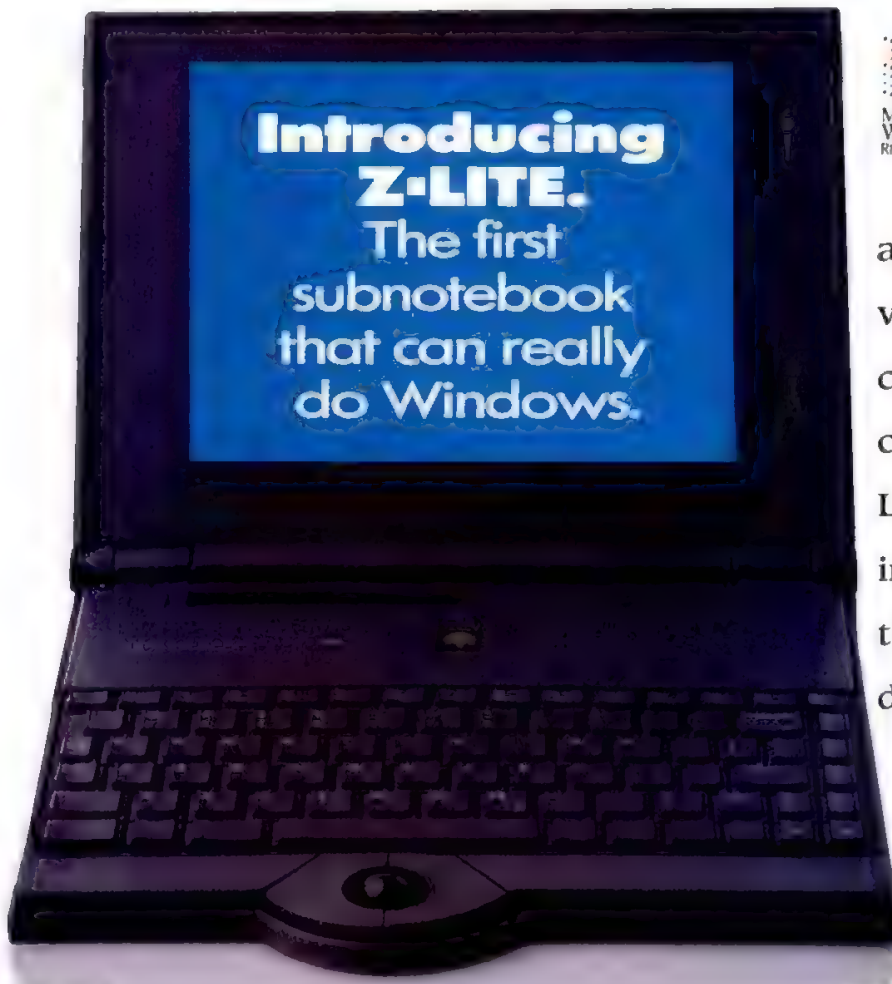
good thing you've discovered new Z-LITE 320L. Because no lightweight does Microsoft Windows like Z-LITE. Z-LITE combines every heavyweight feature you need to run Microsoft Windows in an ultra-lightweight PC. Like the power of Intel 386SL technology—instead of the no-name chip others foist off on you.

**The first
subnotebook
with two
PCMCIA
TYPE II SLOTS.**

The Z-LITE 320L includes our energy-

**The first
subnotebook
with backlit
VGA.**

efficient 3.3V design. It's our newest technology breakthrough, rewarding you with extraordinary battery life and extraordinary features. We even include an "at-a-glance" battery fuel gauge.



Then there's our full size 8.4" backlit VGA display. Rather than the pint-size unreadable screen you find elsewhere. You'll enjoy handling our upfront and center, integrated LITEPOINT pointing device. Others offer a tiny control that seems designed for Lilliputians.



**The first
3.3V
386SL
subnotebook.**

FEBRUARY
1993

So what more can we do for you?

Z•LITE 320L gives you flexibility and options. There's two PCMCIA card slots for accommodating high speed data/fax modems, wireless communications and more.

And to make your life easier, we've combined the external floppy disk drive and AC adapter/charger in an all-in-one design.

Z•LITE 320L is the best of Zenith Data Systems technology, with an unbeatable Z•DIRECT

**"Z•LITE is
light years
ahead of the
competition!"**

Margie Silha,
Zenith Data
Systems

price. If lightweight is the way
you want to go, Z•LITE 320L is
the route to take.



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New Z•LITE



Z•LITE™ 320L

"Full featured subnotebook"

- Intel 20 MHz i386SL (3.3V)
- 2MB RAM user expandable to 6MB
- 60MB hard disk drive
- MS-DOS 5.0 pre-installed
- Optional 3.5" 1.44MB floppy disk drive
- Optional LITEPOINT™ two-button detachable pointing device
- 8.5" VGA backlit black-on-white display with 64 grey scales
- Two PCMCIA type II slots
- NiMH battery pack for up to 3-hours* continuous or up to 6-hours* charge
- 7.6" x 9.9" x 1.5" sloping to 1.1"
- 3.9 lbs

\$1899



ZDS 625nl

"Affordable portable computing"

- Intel 25 MHz i386SL
- 2MB RAM user expandable to 8MB
- 85MB hard disk drive
- 3.5" 1.44MB floppy disk drive
- MS-DOS 5.0 pre-installed
- 9.5" black-on-white VGA display
- 85-key full-travel keyboard
- Serial port, enhanced parallel port, video port, mouse/keyboard/keyboard port
- One internal modem socket
- NiCad battery for up to 3 hours* battery life
- 8.5" x 11" x 1.9" 6.5 lbs

New Lower Price

\$1599

Save \$200

*Battery life depends on application used, power management features selected and peripherals attached.

**Call Z•DIRECT for
the only PCs that
come with all these
big names:
Intel, Conner
and Jeffrey Crouch.**

At Zenith Data Systems we believe you deserve nothing less than blue chip components. So for our PCs, we offer names like Intel for microprocessors and Conner™ for hard drives.



CONNER

And for customer assistance, we offer names like Jeffrey Crouch. Now while Jeff may not be top of mind today, one call and you'll never forget him. Because all our Z•DIRECT customer assistance reps are more than high tech trouble shooters, they're investment counselors.

They understand Z•NOTES and Z•STATIONS are designed for **integrated connectivity**, with an unprecedented ease and breadth of upgradability. It's what we call **investment protection**. With so many options for upgrading your investment available on the market today, the good advice of our



Customer Assistance Center can be a big help. Our Customer Assistance Center is ready to answer your questions Mon.-Fri., 7 AM to 11 PM (CST). Call **1-800-CARE-360**.

All of which brings us to our renowned Z•CARE service. We think it's the best in the



Jeffrey Crouch,
Z•DIRECT Customer
Assistance Center
Representative.

**"I'm more than
just your helpful
hardware man."**



business. Because we offer over **400 authorized service centers** in North America and more than **2,000 service reps** around the world.

With that kind of blanket coverage, you can enjoy on-site service for all our Z•STATIONS the next business day. There's 48-Hour Repair-and-Return or carry-in service for portables. And now Z•CARE offers **optional support up-grades** including network planning, start up, operation and expansion services. Even the com-

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Customer
Assistance
Center.**
Not just
troubleshooters,
investment
counselors.

petition finds our service exceptional. Because we're authorized to keep your network operational even if there is a variety of other PC brands or software in place. As for our competitors, they can only send you to "3rd party" service centers. But why go anywhere else when you can come to Z•DIRECT? Get Z series notebooks and PCs you want at a great low Z•DIRECT price—along with unrivaled Z•CARE service. That's what you can expect from the #1 name in SL portable computing.†

**"Prices change rapidly.
Call for our latest and lowest."**

**Z BEST service is Z•DIRECT.
1-800-289-1316**



**95% of calls
to the ZDS
Customer
Assistance
Centers
enjoy one call
problem
resolution.**



Z•SPORT™ 420S
"High performance portable"

- Intel 20 MHz i486SX
- 85MB hard disk drive with MS-DOS 5.0 pre-installed
- 4MB RAM user expandable to 16MB
- 9.5" (V) black-on-white edgelit LCD 640 x 480 VGA with 64 grey shades, simultaneous video support
- 3.5" 1.44MB floppy disk drive
- 8.5" x 11" x 1.9" only 6.0 pounds
- Up to 2.5 hours battery life*
- 86-key keyboard with dedicated cursor and function keys
- Serial, parallel, external video, mouse ports
- Optional ZDS docking unit

New Lower Price

\$1999

Save \$550



Z•SPORT 425S
"Powerful and portable"

- Intel 25 MHz i486SX
- 120MB hard disk drive with MS-DOS 5.0 pre-installed
- 4MB RAM user expandable to 16MB
- 9.5" (V) black-on-white edgelit LCD 640 x 480 VGA with 64 grey shades, simultaneous video support
- 3.5" 1.44MB floppy disk drive
- 8.5" x 11" x 1.9" only 6.0 pounds
- Up to 2.5 hours battery life*
- 86-key keyboard with dedicated cursor and function keys
- Serial, parallel, external video, mouse ports
- Optional ZDS docking unit

New Lower Price

\$2299

Save \$500

*Battery life depends on application used, power management features selected and peripherals attached.

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**Buyer's Bill
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Buy Z•DIRECT for investment protection. Z series has unprecedented upgradability, integrated connectivity, ease of use and design. **Right** Buy Z•DIRECT for experienced direct sales consultants. No order takers at Zenith Data Systems. **Right** Buy Z•DIRECT for direct answers. 95% of your problems are solved in one call. **Right** Buy Z•DIRECT for direct, 48-hour shipment. **Right**

If it's not
Z•DIRECT
it's just
not right.

Buy Z•DIRECT for no hassle returns. No questions asked, whatever the reason. Return your PC within 30 days.** **Right** Buy Z•DIRECT for direct technical support and a

complete array of direct-to-you peripherals, accessories and software. **Right**

*Based on advertised products as configured and availability.



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Z-425SX

"Economical i486 value"

- Intel 25 MHz i486SX
- 4MB RAM user expandable to 40MB
- 170MB hard disk drive with MS-DOS 5.0 and Microsoft Windows 3.1 pre-installed
- Super VGA color monitor, 1024 x 768
- 3.5" 1.44MB internal floppy disk drive
- Mouse
- 5 open 16-bit ISA slots
- One 5.25" accessible drive bay
- One-year limited warranty

New Lower Price

\$1449

Save \$300



Z-433DX

"Affordable i486 performance"

- Intel 33 MHz i486DX
- 4MB RAM user expandable to 40MB
- 170MB hard disk drive with MS-DOS 5.0 and Microsoft Windows 3.1 pre-installed
- Super VGA color monitor, 1024 x 768
- 3.5" 1.44MB internal floppy disk drive
- Mouse
- 5 open 16-bit ISA slots
- One 5.25" accessible drive bay
- One-year limited warranty

New Lower Price

\$1749

Save \$300



ZENITH DATA SYSTEMS

A Bull Company

Thinking Ahead.

SOFTWARE

Applications Add-Ins

Product	List price	Company	Works with*	Description
Spreadsheet Add-Ins (continued)				
Noteworthy	\$79.95	Funk Software Inc. (800-822-3865, 617-497-6339)	1-2-3, Symphony	Notes for spreadsheets. A pop-up window allows users to enter up to 8,000 characters' worth of text in a note attached to a cell. The package includes full editing commands and search-and-replace ability.
101 Macros Plus for 1-2-3	\$69.95	Individual Software Inc. (800-822-3522, 510-734-6767)	1-2-3	Ready-to-use macros for shortening calculation time, invoking word wrap, addressing form letters, and printing labels. Includes a point-and-shoot method for invoking macros.
Options @analyst	\$249.00	Tech Hackers Inc. (212-344-9500)	Excel, 1-2-3, Quattro Pro, Symphony	Basic @functions to supplement built-in spreadsheet functions. Calculates options on bonds, commodities, currencies, equities, and futures.
PanaView	\$99.00	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	Allows users to view an entire spreadsheet at one time; displays up to 25,000 cells and range names. A zoom window shows actual cell contents.
PC Publishing Fontasia	\$159.95	Intex Solutions Inc. (617-449-6222)	1-2-3	15 new typefaces for 1-2-3. In some cases the package requires Impress, from PC Publishing.
PC Publishing Success	\$159.95			An add-in presentation program that creates presentations on paper, overhead transparencies, or slides. In some cases the package requires Impress, from PC Publishing.
P.D. Queue	\$89.95	Funk Software Inc. (800-822-3865, 617-497-6339)	1-2-3, Symphony	Spools 1-2-3 print jobs in the background to free up the system. Users can view up to 99 jobs in the queue; kill, pause, prioritize, and redirect jobs; and more.
Personal Accounting System	\$35.00	Easy As... Inc. (410-539-5540)	1-2-3, Symphony	Spreadsheet templates that provide budgeting functions and a single receipts and disbursements journal. Prints account summaries, income/expenditure statements, and reconciliation reports.
Personal Mailing System	\$35.00			Spreadsheet templates that maintain names and addresses for form letters, labels, and mailings.
PowerMacros for Excel	\$49.95	Individual Software Inc. (800-822-3522, 510-734-6767)	Excel	150 macros for tasks such as merging spreadsheet files and viewing databases. Includes an appointment calendar, a notepad, and a pop-up calculator.
PowerMacros for 1-2-3	\$49.95		1-2-3, Quattro Pro	
Presentation ValuePack	\$49.95	Borland International Inc. (800-331-0877, 408-438-8400)	Quattro Pro, Quattro Pro for Windows	Lets users create presentations and slides. Includes clip art, macros for viewing clip art and creating SpeedBars, scalable Bitstream fonts, sound effects, and templates.
PrintVision	\$29.95	BLOC Publishing Corp. (800-955-1888, 305-445-0903)	1-2-3, Symphony	Provides print previews for output to HP and compatible printers. Includes a zoom feature.
Profit Planner Plus	\$99.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3	Builds financial statements for a business acquisition, business plan, operations forecast, or product plan. Generates standard tables in detailed, summary, or percentage format.
Pro-Trak	\$79.00	Village Software Inc. (800-724-9332, 617-695-9332)	1-2-3	A project accounting system that includes cost control, forecasting, and reporting. Generates on-screen and printed reports.
Ready to Run Accounting	\$199.95	Intex Solutions Inc. (617-449-6222)	1-2-3, Quattro Pro	Five accounting modules that work within 1-2-3 or Quattro Pro, including Accounts Payable, Accounts Receivable, General Ledger, Inventory/Order Entry, and Payroll.
Rescue Plus	\$149.95	Intex Solutions Inc. (617-449-6222)	1-2-3, 1-2-3 for Windows, Symphony	Recovers lost, damaged, or accidentally erased spreadsheets. Includes five recovery utilities.
Sales & Market Forecasting Toolkit	\$149.95	Palo Alto Software Inc. (800-229-7526, 415-325-3190)	Excel, 1-2-3	Helps forecast market share and other statistics. Provides graphics.
SeeMORE	\$99.95	Personics Corp. (508-658-0040)	1-2-3, Symphony	A screen manager that gives users a choice of compressed formats that double, triple, or quadruple the number of cells appearing on-screen. Also allows users to zoom in or out.
Sideways	\$89.95	Funk Software Inc. (800-822-3865, 617-497-6339)	1-2-3, Quattro Pro, Symphony	Prints all the columns of a spreadsheet sideways (contiguously). Also includes print-formatting capabilities such as type styles and borders.
Spellin!	\$125.00	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	Spell-checker for 1-2-3 spreadsheets. Checks a range or an entire spreadsheet against a 90,000-word dictionary and offers alternative spellings that the user can accept or reject.
Spreadsheet Echo	\$99.95	Temair Software Corp. (401-454-4565)	1-2-3	Synthesizes a male or female voice that reads back the contents of spreadsheet cells in English, French, German, Italian, Japanese, or Spanish. Headphones included.
Spreadware Statistics Menu	\$229.00	Spreadware (800-793-4561, 619-347-2365)	Excel	Enhances the analytical power of Excel 4.0 by providing simple and complex statistical analysis.
SQZ!	\$99.00	Symantec Corp. (800-441-7234, 408-253-9600)	1-2-3, Symphony	Shrinks spreadsheet files by as much as 90 percent. Saves files in a proprietary format (.WK! or .W3!). With SQZ! enabled, /File Retrieve shows only SQZ! files.
TableTalk	\$79.95	GreyMatter International (617-876-6969)	1-2-3, Symphony	Reorganizes, manipulates, and calculates spreadsheet data by treating the data as a table rather than as a set of cells.
Tax Solver	\$49.95	Intex Solutions Inc. (617-449-6222)	Excel, 1-2-3, 1-2-3 for Windows, Symphony	Tax preparation add-in, utilizes spreadsheets' "what if" capabilities to identify ways of paying less tax. All calculations are built-in. The package uses over 40 IRS-approved forms.
Trans	\$125.00	Intex Solutions Inc. (617-449-6222)	Excel, 1-2-3, 1-2-3 for Windows, Quattro Pro, Symphony	Integrates ASCII files into spreadsheets, replacing the Parse command. Also formats all text and numerical information into the correct spreadsheet notation, such as currencies.
2-D Graphics 3-D Graphics	\$99.95 each; \$150.00 for both	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	Two products that add new graph types to 1-2-3 and Symphony, including bubble charts, dual-y-axis graphs, and mixed bar/line graphs. 3-D Graphics' 3-D graphs can be rotated 360 degrees and viewed from different perspectives. Both packages add color options.
What-If Solver	\$199.95	Frontline Systems Inc. (702-831-0300)	1-2-3, Symphony	"Backsolves" spreadsheet problems, including goal seeking with one or more variables, linear programming, and solving systems of nonlinear equations and inequalities.

* Contact vendors for questions of compatibility with specific versions of spreadsheets or word processors.

CONTINUES

SOFTWARE

Applications Add-Ins

Product	List price	Company	Works with*	Description
Spreadsheet Add-Ins (continued)				
What's Best!	\$149.00 to \$4,995.00	Lindo Systems Inc. (800-441-2378, 312-871-2524)	Excel, 1-2-3, Quattro Pro, Symphony	Adds linear programming to 1-2-3. Performs "what if" analysis for answers such as maximum profit with minimum cost. Comes in different sizes, from 400 to 32,000 variables.
Worksheets-On-A-Disk	\$59.95	Infosource Inc. (800-622-2995, 407-677-0300)	1-2-3	60 ready-to-use spreadsheet templates. Includes bank reconciliation, employee tracking, expense reports, and loan calculations.
The Worksheet Utilities	\$149.95	Funk Software Inc. (800-822-3865, 617-497-6339)	1-2-3	Tools for 1-2-3 that include a formula editor and a file manager as well as utilities for print settings, search-and-replace, and AutoSaving files at user-defined time intervals.
Write-In	\$129.95	Blossom Software Corp. (617-497-2160)	1-2-3, Symphony	Add-in word processor that merges text and graphics in a spreadsheet. Provides mail-merge capabilities.
XYZ:Spread	\$175.00	Intex Solutions Inc. (617-449-6222)	1-2-3, Symphony	Distributes data from one worksheet to many others. The matching logic allows users to broadcast information to worksheets even when layouts are dissimilar.
Word Processor Add-Ins				
AutoIndex	\$349.00	Readware (714-551-2049)	Word for Windows	Document retrieval program that attaches itself to the File menu or the Toolbar in Word for Windows. Allows users to index documents, then search by keyword, subject, or text.
The Button Cube	\$89.95	Software Workshop Inc. (800-762-9550, 801-224-6865)	WordPerfect for Windows	Includes 500 buttons for WordPerfect functions that can be assigned to one of four sides of a 3-D button cube. The cube can be configured and customized.
By Design for WordPerfect	\$99.00	Streetwise Software (800-743-6765, 310-829-7827)	WordPerfect	A desktop publishing add-in with clip art, design tools, graphics fonts, graphics previews, page designs, and placement tools.
By Design for WordPerfect for Windows	\$99.00		WordPerfect for Windows	
DocsDB	\$69.95	Pro JV Consultants (310-827-8786)	Word for Windows	Organizes documents in a hierarchical fashion for easy searching and retrieving.
Doc-To-Help	\$295.00	WexTech Systems Inc. (212-949-9595)	Word for Windows	Helps produce custom documentation with callouts, floating footers, indexes, page layouts, and styles, then converts the document into Windows on-line help.
DocuComp II	\$199.95	Advanced Software Inc. (800-346-5392, 408-733-0745)	Word for Windows	A redlining tool that tracks inserted, deleted, replaced, and moved text. Compares two versions of a document, or files from different word processors, and keeps records of changes.
FaceLift for WordPerfect	\$99.00	Bitstream Inc. (800-522-3068, 617-497-6222)	WordPerfect	Allows users to utilize any of the 200 scalable typefaces in Bitstream's Speedo format when printing to an HP-compatible printer or almost any dot matrix printer.
FastFonts for DOS	\$99.95	Atech Software (800-786-3668, 619-438-6883)	Microsoft Works, Word, WordPerfect	30 typeface outlines with the full international character set. Installs fonts in either Intellifont or PostScript. The Metrics Editor lets users control kerning, leading, and spacing.
Fileware	\$44.95	Total System Solutions Inc. (718-375-2997)	Word for Windows	13 macros that provide basic file management (copy, delete, move, and rename files and create directories). Also includes a quick-launch menu for Windows applications, file locking and password protection for WinWord, and more.
Fonts-on-the-Fly	\$99.95	Laser Tools Corp. (800-767-8004, 510-420-8777)	LetterPerfect, WordPerfect, WordPerfect for Windows, WordPerfect Works	Provides 19 typefaces and lets users print Intellifonts to any HP-compatible printer or to most dot matrix and ink jet printers.
Glyphinx Fonts for WordPerfect	\$99.00	SWFTE International (800-237-9383, 302-234-1740)	WordPerfect	Five fonts—Corporate, Exchequer Script, Rockland, Roman, and Zingbats—that can appear in sizes from 3 to 120 points. Supports six effects, including shadow and outline.
Grab Plus with Wingrab	\$49.95 (shareware registration)	ZPAY Payroll Systems Inc. (800-468-4188, 813-866-8233)	Word for Windows	Links address databases to envelope- and label-printing macros. Will search documents for an address, copy it to the Windows Clipboard, and paste it into an envelope. Available on CIS in the MSWORD Forum as GRAB.ZIP, GRABDB.ZIP, and WINGRA.ZIP.
GToolbox	\$39.95 (shareware registration); \$44.95 with disk	Guy Gallo (CompuServe 71171,3555)	Word for Windows	A collection of 30 macros for changing footnotes to annotations and vice versa, printing noncontiguous pages, and more. Available on CIS in the MSWORD Forum as GTBX10.EXE.
Key Correspondence	\$39.95	SoftKey Software Products Inc. (407-367-0005)	Word, WordPerfect	Prompts users to personalize one of 639 business letters for a variety of situations.
Key ResumeWriter	\$39.95			Interviews the user and fills in information in one of 100 resumes, then creates a cover letter.
Ko-Pilot for WordPerfect	\$89.95	Insight Resource Inc. (914-332-1589)	WordPerfect	Offers menu-driven, task-oriented help for WordPerfect. Guides users step by step through a process such as mail-merge.
Macromania for WordPerfect	\$59.95	Infosource Inc. (800-622-2995, 407-677-0300)	WordPerfect	250 macros to speed up work in WordPerfect. Separate versions are available for WordPerfect 4.2, 5.0, and 5.1.
macroMinder	\$89.95	Fredrik Rolf Associates (303-989-0880)	WordPerfect	Keyboard and macro management system that includes over 100 macros and utilities. Also features help, macro-customization, and screen-saver tools.
MasterWord	\$99.00	Alki Software Corp. (800-669-9673, 206-286-2600)	Word for Windows	A collection of macros and add-in programs, including an extra toolbar, added on-line help, and a template manager.
MathType	\$199.00; \$89.00 for owners of Word for Windows 2.0	Design Science Inc. (800-827-0685, 310-433-0685)	Ami Pro, Excel, Word for Windows, WordPerfect for Windows	A mathematical-equation formatter. Adds functionality to the Word for Windows equation editor. Users can place common symbols and templates on a ribbon below the menu bar.
MergeMaster	\$79.95	Stairway Software (800-782-4792, 804-977-7770)	Word, WordPerfect	Merges database files with word processor documents. Works with dBASE, Paradox, and compatible database formats.

* Contact vendors for questions of compatibility with specific versions of spreadsheets or word processors.

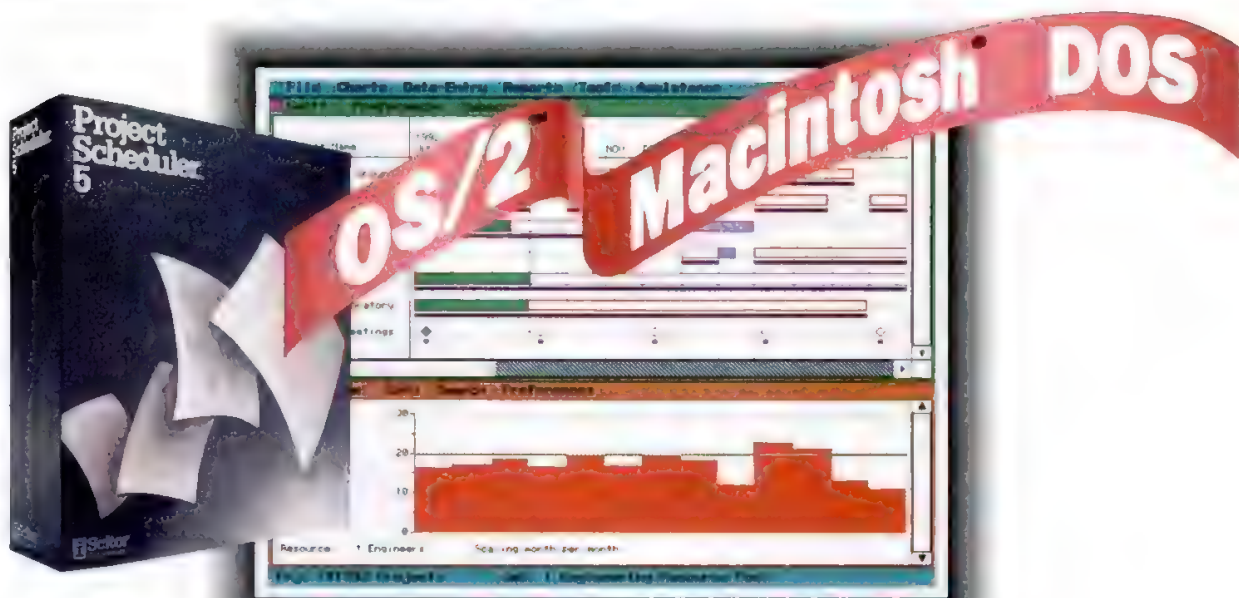
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Applications Add-Ins

Product \	List price	Company	Works with*	Description
Word Processor Add-Ins (continued)				
Microsoft Word Comprehensive Spelling	\$79.95	Alki Software Corp. (800-669-9673, 206-286-2600)	Word, Word for Windows	Adds 74,100 words to Microsoft Word's dictionary.
Microsoft Word Comprehensive Thesaurus	\$79.95			Adds 26,000 terms to the Word thesaurus
Microsoft Word Proofing Tools	\$99.95			Checks spelling and suggests synonyms in Danish, Dutch, English (American or British), Finnish, French (Canadian or European), German, Italian, Norwegian, Portuguese (Brazilian or European), Spanish, and Swedish.
MPE4WP	\$20.00 (shareware registration); \$25.00 with disk	Michael H. Shacter (301-530-6982)	WordPerfect	Allows users to write macros in WordPerfect. One executable file converts text files to macros; another does the reverse. Available on PC MagNet in Library 16 of the Utilities/Tips Forum.
Office Accelerator	\$129.00	Baseline Data Systems (310-214-8528)	Ami Pro, Word for Windows, WordPerfect for Windows	Uses DDE and word processing macros to generate business forms, envelopes, faxes, labels, and letters. Maintains a phone book database.
PagePak	\$99.00	Imageline Inc. (804-644-0766)	WordPerfect	Contains 75 page designs with text and graphics elements. Categories include books and manuals, borders, brochures, maps and diagrams, newsletters, and presentations.
Perfect Complement	\$195.00	Williams & Wilkins (800-527-5597, 410-528-4000)	WordPerfect	Automates document production by accessing information from databases. Merges records from dBASE and Paradox. Indexes and organizes documents; builds name and address files.
Perfected!	\$149.95	Key Functions Inc. (416-928-1943)	WordPerfect	Automates 150 routine office tasks. Manages address directories and lists, prints name tags, and includes administrative forms such as invoices and financial reports.
Perfect Presentations	\$95.00	Desmond International Inc. (800-626-9650, 617-239-1280)	WordPerfect	Turns WordPerfect into presentation graphics software. Includes style templates for charts and graphs, clip art, large fonts, and slides and tables.
PowerMacros for Word	\$49.95	Individual Software Inc. (800-822-3522, 510-734-6767)	Word	300 macros for foreign characters, forms design, mailing labels, mail-merges, newsletters, and on-line help.
PowerMacros for WordPerfect	\$49.95		WordPerfect	
Prime	\$49.95	Prime Consulting Group (310-318-5212)	Word for Windows	Links WinWord to FaxWorks (formerly Faxit) and PackRat via macros. The four main components are document assembly, document management, fax connection, and PackRat data search.
PrimeType	\$99.95	LaserTools Corp. (800-767-8004, 510-420-8777)	LetterPerfect, WordPerfect, WordPerfect for Windows, WordPerfect Works	Allows users to use Type 1 fonts with WordPerfect and print them to almost any non-PostScript printer.
Relate	\$149.00	ObjectSoft Corp. (201-930-0582)	Ami Pro	Personal information manager that installs on the Ami Pro menu bar. Supports auto-dialing, auto-faxing, envelope and label generation, and mail-merge with Ami Pro.
RoboHelp	\$495.00	Blue Sky Software Corp. (800-677-4946, 619-459-6365)	Word for Windows	Quickly compiles on-line help for Windows. Does not include the Windows help compiler, but uses the same native file format as the compiler format, allowing easy import of existing help files.
ScreenExtender for WordPerfect	\$99.95	Stairway Software (800-782-4790, 804-977-7770)	WordPerfect	Screen management utility that stretches the size of the user's viewing area to eliminate the need to scroll from side to side. 25 screen sizes can display up to 144 characters per line.
Spelllex Legal	\$79.00	Spelllex Development Inc. (800-442-9673, 813-933-7394)	WordPerfect, WordPerfect for Windows	Each dictionary adds to WordPerfect's main dictionary. The different editions supply 30,000 legal terms, 100,000 medical terms, 24,000 pharmaceutical terms, and 50,000 scientific and engineering (technical) terms.
Spelllex Medical	\$79.00			
Spelllex Pharmaceutical	\$79.00			
Spelllex Technical	\$79.00			
StampIt	\$89.95	Enhancement Software (800-869-1122, 213-850-1362)	WordPerfect, WordPerfect for Windows	Lets users print documents with the computer equivalent of rubber-stamp imprints on them. 60 rubber-stamp messages include "Exhibit—," "Rush," and "Top Secret."
Stedman's/25	\$99.50	Williams & Wilkins (800-527-5597, 410-528-4000)	WordPerfect	Medical spelling dictionary with 150,000 terms. Includes a common word list for quick searching.
SuperScript Pro	\$159.00	Inherit The Earth Technologies (310-559-3814)	WordPerfect	Macros for writing scripts for screen, stage, and television. Works while the user writes. One macro allows the writer to enter characters' names once, then a single letter thereafter.
Super Speller IV	\$49.95	CR&S Software (800-767-4911, 509-582-5913)	WordPerfect	Legal, medical, religious, and scientific spelling dictionaries in one package.
TrueType for DOS	\$99.95	MicroLogic Software Inc. (800-888-9078, 510-652-5464)	Microsoft Works, Word, WordPerfect	36 TrueType scalable fonts for DOS applications. Includes a preview window for removing fonts from WordPerfect's printer driver, thus avoiding WordPerfect's printer definition program.
Utley-Cross Correspondence Manager	\$89.00	The Utley-Cross Co. (508-263-0386)	WordPerfect	Keeps track of letters the user writes and maintains. Performs searches for names, places, telephone numbers, or writers' names.
WinEnvelope	\$129.00	Duncan Clark Inc. (714-222-2833)	Ami Pro, Word for Windows, WordPerfect for Windows	Windows envelope printer that installs via macros. Includes icons for Ami Pro's SmartIcons and WordPerfect for Windows' Button Bar. Imports data in many formats, including .WKS.
WOPR	\$49.95 (shareware registration)	Pinecliffe International (800-659-4696, 314-965-5630)	Word for Windows	A collection of macros, including a toolbar editor and an envelope printer. Available on PC MagNet in Library 10 of the Utilities/Tips Forum as WOPRA EXE and WOPRB EXE.
Word for Word, Word for Windows Version	\$79.95	Mastersoft Inc. (800-624-6107, 602-277-0900)	Word for Windows	Performs conversions between Word for Windows and over 50 other formats, including Ami Pro and WordPerfect for Windows. The original file's attributes and layout are preserved.

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ENDS



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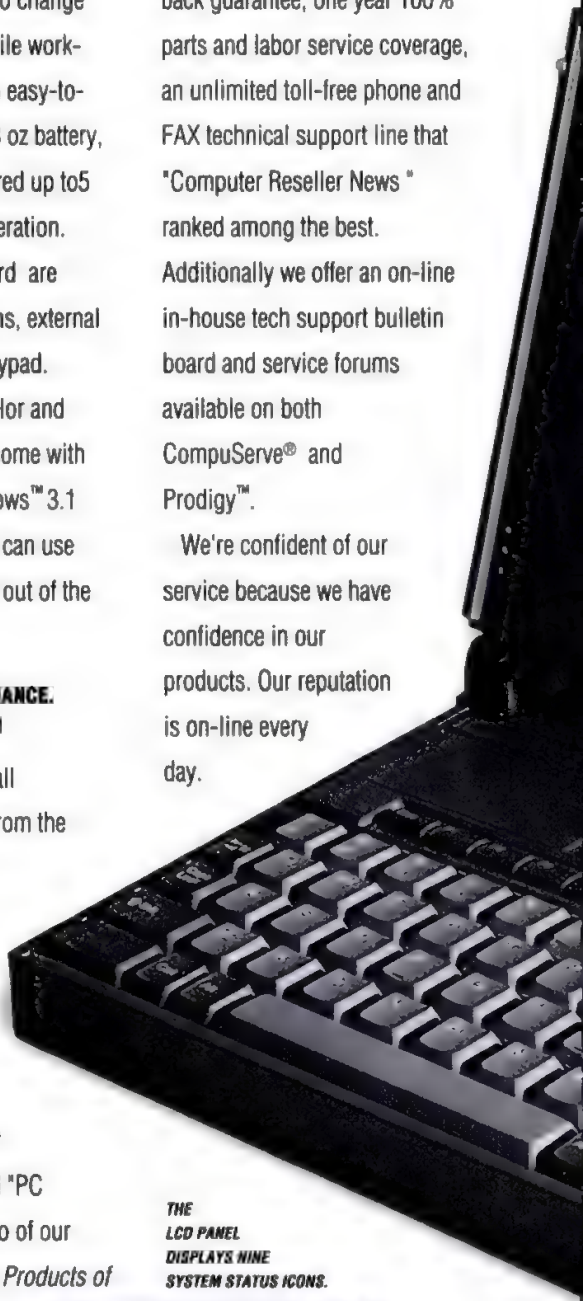
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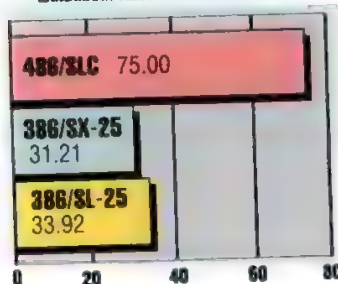
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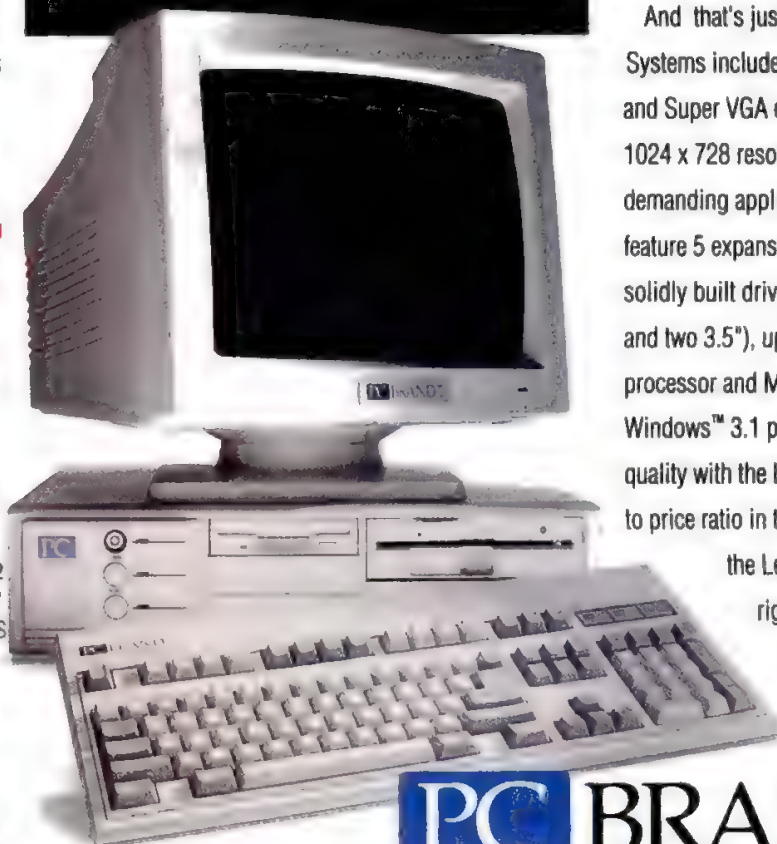
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Applications Add-Ins

S. Robertson Blvd., #326, Los Angeles, CA 90035; 310-559-3814. List price: \$159. Circle 512 on reader service card

MicroLogic Software Inc.

TrueType for DOS

BY EDWARD MENDELSON

TrueType scalable fonts work seamlessly and effortlessly in Microsoft Windows. But they were unusable with all DOS ap-

Works with:

- Microsoft Word (DOS)
- WordPerfect (DOS)

lications until the arrival of MicroLogic's \$99.95 TrueType for DOS. This font add-on for the DOS versions of WordPerfect 5.x and Microsoft Word 5.x allows you to use any TrueType font when printing to any HP- or Canon-compatible laser printer or to any standard dot matrix model.

TrueType for DOS runs as a shell around the word processor, occupying 45K of conventional RAM. As with similar font add-ons, you won't be aware of its existence in normal use. It uses the same TrueType rasterizer built into Windows, so the characters on the page exactly match the type you get from Windows. The printer fonts are generated inside your computer for faster output than you can get from your printer alone.

The program's installation screen includes a preview window and lets you remove TrueType fonts from WordPerfect's printer drivers without using WordPerfect's complex printer definition program. But unlike rival font add-ins, it doesn't install kerning pairs, and the 36 TrueType fonts that come in the package are unappealing imitations of classic designs. You can jazz up your TrueType fonts, however, with borders, stripes, and other special effects.

TrueType for DOS has no effect on Windows printing—other than giving you these 36 additional fonts. However, if you want to use TrueType fonts with WordPerfect's printer drivers when running WordPerfect for Windows, try MicroLogic's other font product, MoreFonts. The only program

that makes this possible, MoreFonts uses MicroLogic's proprietary font format to provide on-the-fly fonts for DOS and Windows.

MicroLogic Software Inc., 1351 Ocean Ave., Emeryville, CA 94608-1128; 800-888-9078, 510-652-5464. List price: \$99.95.

Circle 513 on reader service card

The Utley-Cross Co.

Utley-Cross Correspondence Manager

BY EDWARD MENDELSON

The name says it all. The Utley-Cross Correspondence Manager is an \$89 shell around WordPerfect for DOS that keeps track of your mail. It lets you locate letters on your hard disk for quick viewing in the program itself or for editing in WordPerfect. It performs separate searches for personal names, place names, and telephone numbers. It can also narrow a search to letters written by your ex-partner to your ex-lawyer. Moreover, the program can keep track of documents that aren't letters. But its real strength is its ability to sort your mail.

The idea of the program is better than its implementation, however. Unlike indexing programs such as Lotus's Magellan, the Utley-Cross package can find files in only one directory at a time. If it a file isn't in a particular directory, you'll have to work through a tedious menu to choose another directory and

Works with:

- WordPerfect (DOS)

start the search again.

The indexes, in ASCII format, include capitalized words and section headings only, so you can't search for a word such as *bankruptcy* if you typed it in lowercase. The program distinguishes greetings, addresses, and other parts of a letter well, and it includes social security numbers in its index of telephone numbers.

You can use the program to find all letters addressed to a specific name or address and then move the matching files to a new directory. The program tries not to overwrite existing files during a copy or move, and it gives the copied file a numeric extension, such as 001.

You can choose either a slow, non-standard graphic interface that leaves two-fifths of your screen blank or a faster, full-screen text mode. There are some keyboard shortcuts, but you'll need a mouse to get through the opening menu.

Many of the functions in The Utley-Cross package are duplicated—often more conveniently—in WordPerfect's own List Files menu. Still, WordPerfect doesn't give you options to search separately through addresses and names.

If you can use its special functions and tolerate its inconsistent and nonstandard interface, this program offers some unique and easy ways to sort your mail.

The Utley-Cross Co., 46 Middle Rd., S-100, Boxborough, MA 01719; 508-263-0386. List price: \$89.

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Duncan Clark Inc.

WinVeloce

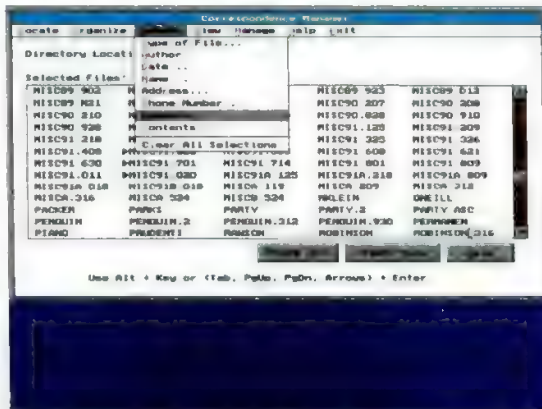
BY BARRY SIMON

Duncan Clark's WinVeloce program is a stand-alone Windows application that installs via macros as an add-in for the three major Windows word processors: Lotus's Ami Pro, Microsoft Word for Windows, and WordPerfect for Windows. It includes custom icons that you can add to Ami Pro's SmartIcon sets or WordPerfect's Button Bar.

Works with:

- Ami Pro
- Microsoft Word for Windows
- WordPerfect for Windows

The macros paste a document's first page to the Clipboard, launch WinVeloce, and paste that page into it. Win-



The Utley-Cross Correspondence Manager, from The Utley-Cross Co., uses a nonstandard graphic interface in WordPerfect that wastes the bottom part of the screen.

Applications Add-Ins

Velope parses the page, grabs the recipient's address, and, where appropriate, grabs a return address.

WinVelope lets you store as many "to and from" addresses as you want and can import data in many formats, including



Duncan Clark's WinVelope has a graphical menu design mode that lets you select envelope design, position, and fonts and helps automate the process of entering addresser and addressee.

.DBS and .WKS. Its stylesheets support numerous envelope types and multi-column sheets of labels. If you have an envelope feeder, you can mark multiple addresses on its list (using standard Windows Shift-Click, Ctrl-Click list handling) and batch print your envelopes.

Unlike its competitors, Grab Plus with Wingrab and WOPR, the WinVelope program lacks support for logos and notes (such as *Air Mail*). Like its competitors, WinVelope supports postnet codes. Overall, however, the package lacks the visual elegance of Wingrab or the structural elegance of WOPR's Envelope design.

Duncan Clark Inc., 1401 Dove St., #560, Newport Beach, CA 92660; 800-432-9466, 714-222-2833. List price: \$129.

Circle 517 on reader service card

Pinecliffe International WOPR

BY BARRY SIMON

Pinecliffe International's WOPR is a collection of macros for Microsoft Word for

Works with:

• Microsoft Word for Windows

Windows, as well as a stand-alone program that changes WinWord's look. It has two main compo-

nents—an envelope printer and a toolbar editor—as well as a number of useful, additional macros.

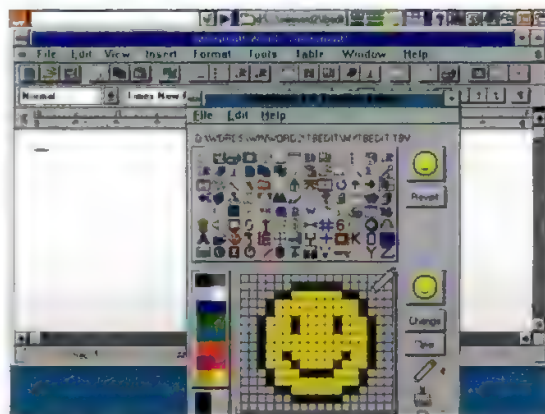
The envelope printer goes beyond WinWord's own facility in a number of ways: It allows multiple "templates," each with its own font choices, envelope size, and return address. It has postnet codes and allows insertion of logo or text, such as *Air Mail*. It supports mail-merge via WinWord's own data merge format. On Postscript and HPLJ III printers, it will even print in reverse landscape, so the return address is less likely to come out smudged.

Most of WinWord's toolbar icons are grey and black. WOPR's toolbar editor lets you build a custom set of colored icons for the toolbar. This editor includes a simple paint mode, and it can even capture little pieces of the screen to use as icons.

The 2x4 macro allows reduced printing with two or four pages on a page, booklet printing, and duplex printing. The WOPR package also includes a FileNew macro, which facilitates storing files for separate projects in different sub-directories.

Among the other useful macros are: one that places the date and time on the menu bar, one that closes all files, and one that performs a word count. Also provided is a library of WOPR routines that you can use in your own personal macros.

WOPR has one small weakness: The



The ability to choose envelope messages with WOPR can be very useful when you want to make sure correspondence reaches the attention of the right person.

WinWord macro language can be slow. But the functionality is so great, you'll probably accept this small shortcoming.

Pinecliffe International, 11900 Grant Pl., Des Peres, MO 63131; 800-659-4696, 314-965-5630. Available as shareware in PC MagNet's Utilities/Tips Forum, Library 10, as WOPRA.EXE and WOPRB.EXE. Registration fee: \$49.95. Circle 518 on reader service card

Mastersoft Inc.

Word for Word, Word for Windows Version

BY BARRY SIMON

Mastersoft's Word for Word, Word for Windows Version is a mouthful, but it's just what the doctor ordered when you have to convert files to or from a word processor that Microsoft Word for Windows doesn't support.

Works with:

• Microsoft Word for Windows

The product supports 35 word-processing formats, including Ami Pro, Lotus Manuscript, Mass-11, MultiMate, Q&A, Volkswriter, and XyWrite. In addition, there is a smart ASCII converter that will interpret files with both single-line breaks and double-line breaks exactly as you'd want—only the double returns become paragraph breaks.

The package is actually a set of DLLs (dynamic link libraries). Once the package is installed, its operation is totally transparent. The new file types appear almost magically when you try a File Open,

File Insert or File Save As command.

Overall, this is a useful, well-done package. Then again, if your main interest is WordPerfect conversion, you should consider the free upgrade to WinWord, Version 2.0B, which has a significantly improved WordPerfect converter built in.

Mastersoft Inc., 6991 E. Camelback Rd., #A320, Scottsdale, AZ 85251; 800-624-6107, 602-277-0900. List price: \$79.95.

Circle 519 on reader service card □

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CIRCLE 122 ON READER SERVICE CARD

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beauty of our NET Solution Network Connection Card: you can begin your network using the cards alone, with the option of

No NOS required, but can be used with most popular NOS's

moving up to peer-to-peer or client/server networking by just adding software.

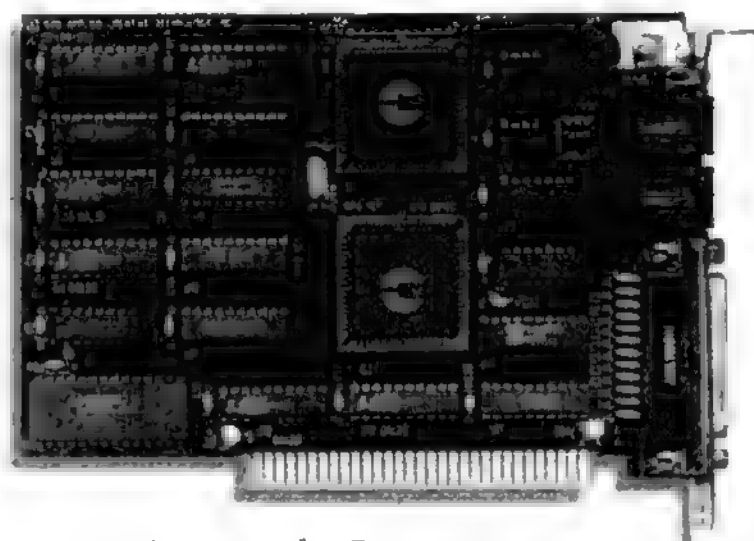
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NETWORK INTERFACE CARDS

Ethernet Adapters: Fast and Efficient

Throughput isn't always the best metric for picking an Ethernet adapter.

What is? Read on as we review 43 EISA and ISA Ethernet cards.

Quick: What's the easiest and least expensive way to connect your PCs to a network? With Ethernet, of course. The low-cost networking solution continues to dominate the LAN market, representing nearly half the network adapters currently installed.

And no wonder. Ethernet adapters have become more standardized and therefore less expensive to manufacture—and buyers reap the benefits. You can now typically spend \$300 to \$400 less on a 10BaseT (unshielded twisted-pair Ethernet) ISA adapter than you would on a comparable Token-Ring card.



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by Frank J. Derfler, Jr.

HIGHLIGHTS

Ethernet Adapters

RELIABLE AND INEXPENSIVE, Ethernet connects more LANs today than any competing network standard. Ethernet cards are becoming easier to install, thanks to wider use of configuration programs. Their speed is increasing, thanks to techniques like bus mastering. Though not as fast as Token-Ring or FDDI (Fiber Distributed Data Interface) cards, Ethernet devices are usually a better bargain.

THE TOP-PERFORMING CARD for client PCs is the \$199 3Com EtherLink III. When you have multiple network segments attached to your EISA server, the \$795 Intel EtherExpress 32 LAN Adapter is the best choice. Eagle's \$995 NE3200 (of which the Intel card is a clone) performed as well as the Intel device, but it is more expensive and doesn't provide as many drivers. For ISA servers, the best bet is the \$320 HP 27247B EtherTwist PC LAN Adapter/16 TP Plus. For a single-segment EISA server, choose the \$800 Gateway G/Ethernet 32EB.

THE MOST ECONOMICAL Ethernet card we tested is the \$109 LANtek 10BaseT Ethernet Card. The CNet CN911E and Accton EtherCombo-32 are the least expensive EISA cards we reviewed.

WHEN BUYING Ethernet adapters, re-

In order to help you get the most power for your dollar, we tested 43 32-bit EISA or 16-bit ISA 10BaseT adapters. We evaluated all of the products in their default configurations under NetWare 3.11.

PURCHASING CRITERIA

As part of our evaluations, we isolated six key criteria.

Performance What separates the winners from the also-rans is performance. But the key aspects of that performance depend on the type of adapter and what it needs to do. Server adapters must be

member that a server card needs high speed and low CPU utilization, and that client cards should have a low price and decent performance. Make sure the adapters are compatible with your network's cabling, and that the drivers support driver standards and your network operating system. Also look for software configurability and built-in management features.

ETHERNET IS ON THE MOVE. Integration on the motherboard, Ethernet instead of fiber-optic cable, and the 100-megabit-per-second Fast Ethernet standard are emerging trends.

ALTHOUGH MANY ADAPTER CARDS do emulate the NE2000 sold originally by Novell and now by Eagle Technology, the products we reviewed also possess some distinctive features. The Cabletron E2119 works as an SNMP (Simple Network Management Protocol) agent, the Cogent E/Master II-AT/TP and Racal NI6510-10BT perform ISA bus mastering, the IMC EtherNic/2000 Combo works with lots of different wiring types, the NIC 10320 has conveniently accessible DIP switches, and the D-Link DE-220T is tiny. The most unusual is the dual-port SMC EtherCard Plus Elite 32T, which has twin Ethernet controllers, buffers, LED arrays, and RJ-45 connectors.

able to transmit and receive packets of all sizes. Servers often connect to multiple segments, so the percentage of CPU utilization each server adapter requires from the server is crucial.

CPU utilization is not nearly as critical in client PCs, which typically house only one adapter. Throughput, however, rises in importance with these adapters—particularly when they send 512-byte frames, a very common frame size.

Our Contributors: FRANK J. DERFLER, JR., is the senior networking editor of *PC Magazine*. STEVEN C.M. CHEN is a certified NetWare engineer who also runs the CCM Consulting company. TONY POMPILI is the systems manager at Ziff-Davis Publishing Co.

Media Support Be sure that the network adapter supports the wiring scheme you need: typically twisted-pair, thin coaxial, or fiber-optic cable. We looked only at adapters that use unshielded twisted-pair (UTP), but vendors may offer variations that deliver comparable results on different media.

Pricing Not surprisingly, EISA adapters are more expensive than ISA adapters. The EISA adapters cost around \$670 versus \$230 for ISA adapters. The ISA server adapters average about \$290. ISA adapters do not operate as effectively as EISA devices in multisegment networks.

Drivers The adapters that support the largest number of drivers work with the greatest variety of networks. Except for the Eagle NE2000T and NE3200, all of the products reviewed support driver specification standards from Novell and Microsoft, and the Open Data Link Interface (ODI) and Network Driver Interface Specification (NDIS) standards. The Eagle products come only with ODI drivers, but NDIS drivers for both cards are usually available with the network operating systems that need them.

Easy Installation Network adapters are becoming easier to install, for two reasons. First, many adapters are now configurable by software, so you no longer have to play with DIP switches and jumpers. And because more adapters are using the drivers written for the Eagle NE2000 or the SMC Elite line, you'll spend less time searching for the right driver.

Smarter Adapters Some Ethernet adapters now provide management information. The cards from Cabletron Systems, Intel Corp., Standard Micro Systems Corp. (SMC), and 3Com Corp., for example, provide basic management utilities that let you retrieve Ethernet information from the network adapter.

BREAKING DOWN THE NUMBERS

Our testing helped highlight which adapters are best suited for which network en-



EDITORS' CHOICE

- **3Com EtherLink III**
- **Intel EtherExpress 32 LAN Adapter**
- **HP 27247B EtherTwist PC LAN Adapter/16 TP Plus**

What's the best Ethernet card on the market? Among client adapters, the answer is clear: 3Com's EtherLink III. Across all packet sizes, the \$199 EtherLink III easily outmuscled its competitors on our tests and earns designation as an Editors'

Choice. It offers a wide range of drivers and is completely software-configurable. LEDs provide information about network traffic, and a management agent lets you retrieve important network information from the card. The adapter is also backed by one of the leading firms in the business.

For client adapters, however, high-speed performance is not the most important buying consideration. Price is, along with NE2000 compatibility, which adds important interoperability features at the expense of some performance.

If you need a less expensive alternative to the EtherLink III, consider LANtek Computer's LANtek 10-BaseT Ethernet Card. The LANtek card gets an honorable mention for its superior price/performance ratio. It costs only \$109, making it the least expensive card we reviewed, and it achieved midrange scores on our Network Throughput test.

The world of server adapters is less clear. Here we found one winner and two runners-up. In a multiple-segment environment, the Intel EtherExpress 32 and the Eagle NE3200 excelled. Both 32-bit EISA adapters have a lot in common: The EtherExpress 32 is a

clone of the NE3200; their nearly identical performance indexes were the highest of the group. Nevertheless, there are differences between the two. The EtherExpress 32 comes with an ODI and an NDIS driver, whereas the NE3200 provides only an ODI driver. And at \$795, the EtherExpress 32 costs \$200 less. The EtherExpress 32 therefore merits an Editors' Choice, and the NE3200 receives honorable mention.

An honorable mention also goes to Gateway's EISA adapter, the G/Ethernet 32EB. This 32-bit bus-mastering adapter showed the highest single-segment throughput of a 32-bit adapter for 512-byte packets. It faltered on multiple segments, however. The device's 32EB's CPU utilization was too high to support heavily taxed Ethernet client adapters effectively.

If you need a server adapter for a single-segment network and money is a key concern, consider the HP 27247B EtherTwist PC LAN Adapter/16 TP Plus. This \$320 ISA adapter had the best overall performance of any 16-bit card on the Network Throughput test and costs only \$320; it earns the third of our Editors' Choice designations.

adapters. Other manufacturers, such as Everex Systems, license their adapters from third parties.

Filter criteria for a market as large as this one are bound to uncover some anomalies. The popular NE2000T and NE3200 cards from Eagle Technology, for example, do not ship with NDIS drivers. Intel, which uses Eagle as an OEM, does bundle the EtherExpress 32, a clone

of the NE3200, with NDIS drivers, so we included that Intel adapter in our testing. And because of Eagle's dominant market presence, we felt that looking at the NE2000T and NE3200 was a must.

LanNet Data Communications offers NDIS and ODI drivers with the adapter we tested, yet licenses its card from Zenith Communications Products, a division of Zenith Electronics Corp. Zenith's

vironments. If your application server, for example, is running a processor-intensive application and it's attached to only one segment, check out Gateway's EISA adapter, the G/Ethernet 32EB, which had the highest throughput for one segment, 512-byte packets.

With large, multisegment networks, you'll be better off with Eagle Technology's more efficient NE3200 and its clone, the Intel EtherExpress 32 LAN Adapter.

If you're not stressing the server, 32-bit EISA adapters typically won't buy you very much. Indeed, you can save hundreds of dollars by purchasing 16-bit ISA server adapters. We looked at five such boards, with the HP 27247B EtherTwist PC LAN Adapter/16 TP Plus offering the best overall performance on a single segment among the 16-bit cards.

There are few differences among the ISA client adapters we tested, largely because these products have similar configurations. All ship with no more than 16K of RAM on-board, and the standard drivers supplied by chip-set manufacturers.

One adapter that does stand out among the crowd is 3Com's EtherLink III. 3Com attributes the adapter's impressive performance to its Parallel Tasking architecture, which lets the adapter process a packet bit by bit as it is received, rather than waiting for the entire packet to enter the client's buffer.

REVIEW CRITERIA

We gathered a group of 32-bit EISA and 16-bit ISA Ethernet adapters supporting unshielded twisted-pair cabling. We included only adapters that come with Novell's ODI and Microsoft's NDIS driver specifications, so they can all operate under most networking environments. We accepted adapters only from original manufacturers or from companies with exclusive marketing rights.

For EISA adapters, we requested that vendors send us only their fastest and most efficient cards. We asked each vendor to provide its most inexpensive 16-bit ISA adapter and its fastest 16-bit ISA product.

Products from a number of vendors do not meet these criteria. Artisoft and Lan-tana Technology, for example, did not offer both NDIS and ODI drivers with their

Ethernet Adapters

cards were not available in time for evaluation, so we tested Lannet's.

Cogent Data Technologies, which targets its 16-bit adapter at the server market, requested that its product not be tested as a client. The vendor includes a client-side driver with the board, however; to provide the most thorough examination, we also tested it as a client card.

A HUNDRED MEGABITS AND BEYOND

By producing smaller chip sets, chip-set vendors are enabling PC manufacturers to sell PCs preconfigured with Ethernet connections.

Some vendors are also looking to increase the performance of the Ethernet network itself. Two proposals have been made by vendors to the IEEE 802.3 standards committee, calling for increasing the speed of Ethernet from 10 megabits per second to 100 Mbps. (For more information, see Trends in this issue.)

The ability to bring 100-Mbps Ethernet to the user's PC may appeal to some, but most users will find that a well-designed Ethernet network running at currently available speeds is just what they need right now. Until Fast Ethernet is approved and ready for the market, look for 10-Mbps adapters that are right for you.

Accton Technology Corp.

Accton EtherCombo-32

Accton EtherPair-16

BY STEVEN C.M. CHEN

Versatility can mean a lot in multi-network environments. With their support for an extensive range of drivers, the Accton EtherCombo-32 and EtherPair-16 deliver that versatility.

The \$699 EtherCombo-32, an EISA server card with above-average performance but a high price, is a good choice for corporate-wide network servers. The \$189 EtherPair-16, a card for ISA clients and servers with below-average performance, is appropriate for small LANs.

The EtherCombo-32 performed well as a bus-mastering EISA adapter, but only with one segment. When we added a second segment, CPU utilization reached nearly 96 percent.

The EtherPair-16 is compatible with the Eagle NE2000 or NE1000, but slower.

As a server adapter, it had the worst performance index and CPU utilization in the one-segment, 1K packet test, probably because it uses programmed I/O instead of bus mastering.

You can configure the EtherPair-16 through its software or choose the default NE1000 mode. The EtherCombo-32 is also software-configurable. Each adapter comes with a lifetime warranty.

• Accton EtherCombo-32, Accton EtherPair-16

Accton Technology Corp., 46750 Fremont Blvd., #104, Fremont, CA 94538; 800-926-9288; fax, 510-226-9833.

List price: EtherCombo-32, \$699; EtherPair-16, \$189.

Circle 464 on reader service card

Cabletron Systems Inc.

Cabletron E2119

BY STEVEN C.M. CHEN

Network management features provide the Cabletron E2119 with a competitive edge. The ISA client adapter comes equipped with an SNMP (Simple Network Management Protocol) agent for gathering network statistics across the LAN. And the Cabletron also includes a simple e-mail utility for sending messages.

You will have to pay extra for these features, though, and sacrifice some speed. The Cabletron costs \$2,300 for a package of 20 adapters, and it performed slightly below the average on our throughput tests—slower, for example, than the Eagle NE2000T. The performance difference might be partially due to its use of shared memory for moving data between the adapter and the host PC. Most of the other client adapters use programmed I/O.

Installation is straightforward. You use software and jumpers to configure the adapter. Two enhanced features make the Cabletron stand out from the rest of the pack: a separate driver that reports network statistics at the PC, which you can retrieve from across the LAN by using SNMP; and the package's basic e-mail program.

With SNMP, you can gather low-level Ethernet statistics, like the number of collisions, at the workstations. Often information is available from the wiring

*The Cabletron E2119
comes with a Simple
Network Management
Protocol agent for
gathering network
statistics across the LAN.*

hub to which the station is connected. However, if the network has a difficult time comparing the values that the PC reports, the hub reports will help diagnose the problem.

Cabletron Systems' hardware documentation can be a little confusing until you find the section covering your adapter. Also, the company provides a warranty that lasts only one year. Nevertheless, the ability to manage the network adapter is important if you have a large network. If you don't mind paying slightly more and sacrificing some performance, the Cabletron can give you some of those management capabilities.

• Cabletron E2119

Cabletron Systems Inc., 35 Industrial Way, P.O. Box 5005, Rochester, NH 03867; 603-332-9400; fax, 603-332-4616.

List price: Package of 20, \$2,300.

Circle 465 on reader service card

CNet Technology Inc.

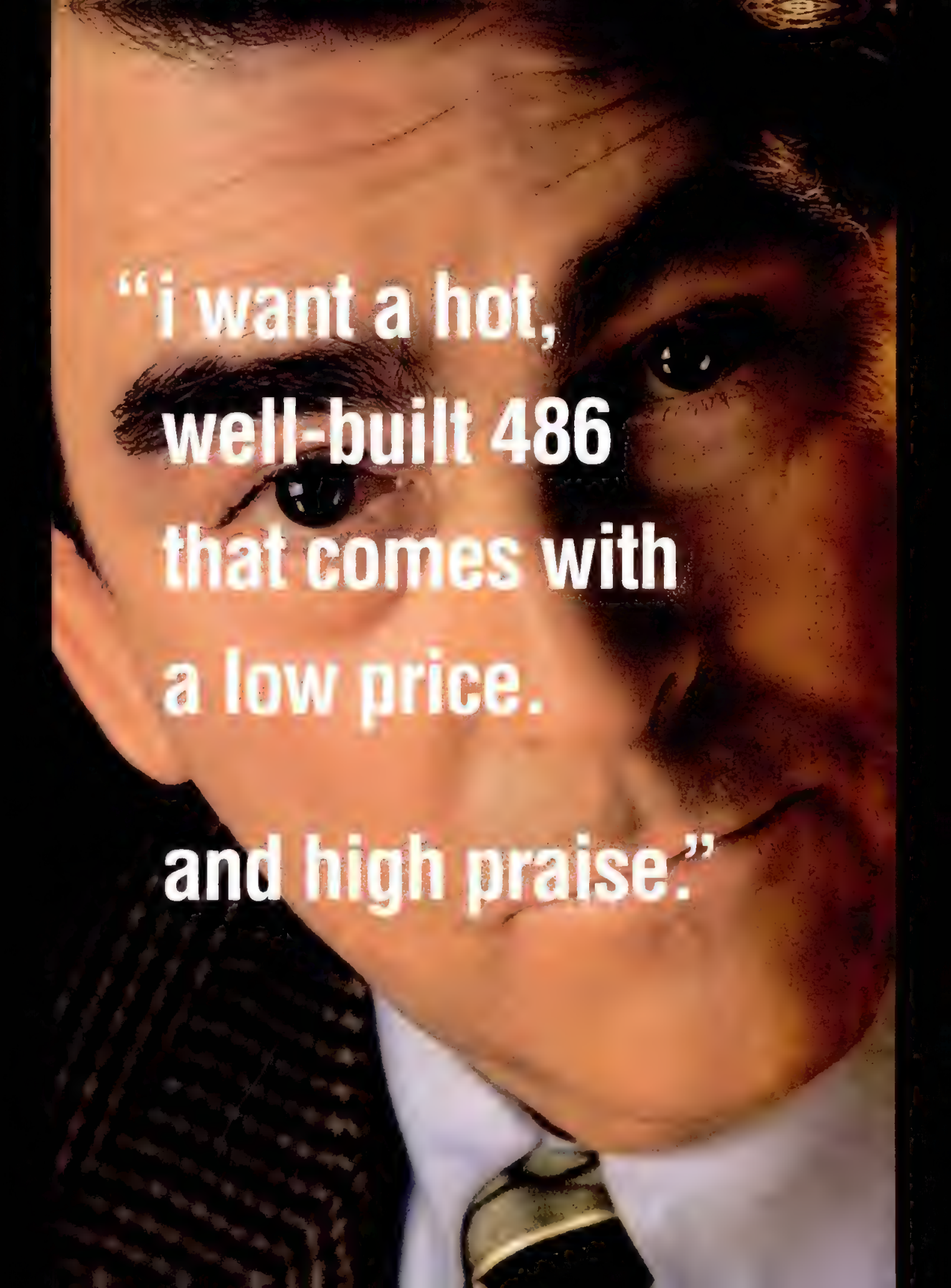
CNet CN680E

CNet CN911E

BY STEVEN C.M. CHEN

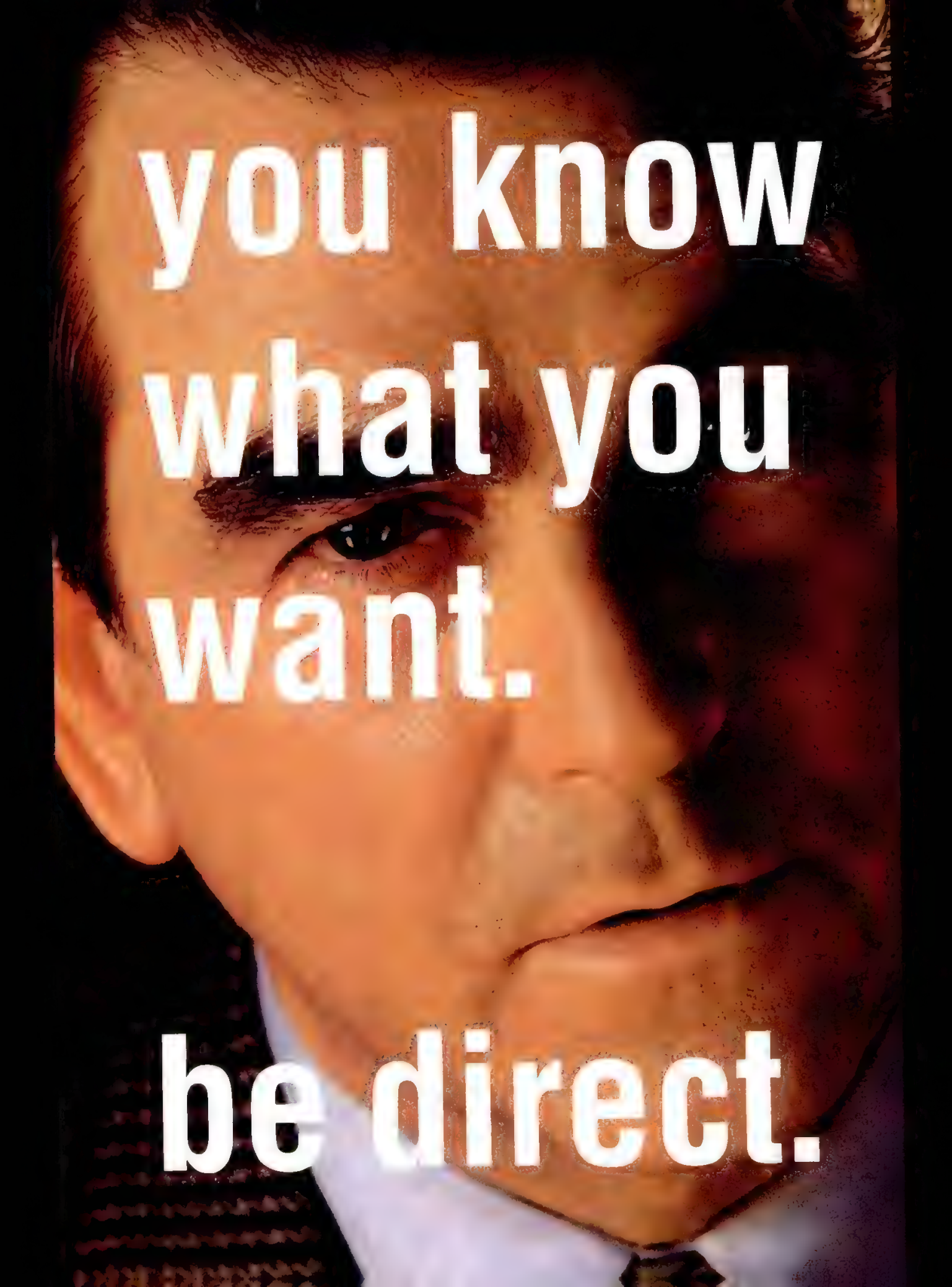
CNet Technology's EISA-based CNet CN911E is less expensive than its sibling, the CNet CN680E, and turned in solid performance on our tests. The ISA-based card also performed decently but has a slightly high price.

At \$499, the CNet CN911E is the least-expensive EISA server adapter reviewed here, and a good choice for one-segment networks. The \$239 CNet CN680E client adapter was an average performer but is a bit expensive. The CN911E bus-mastering adapter had a midrange performance index on our tests



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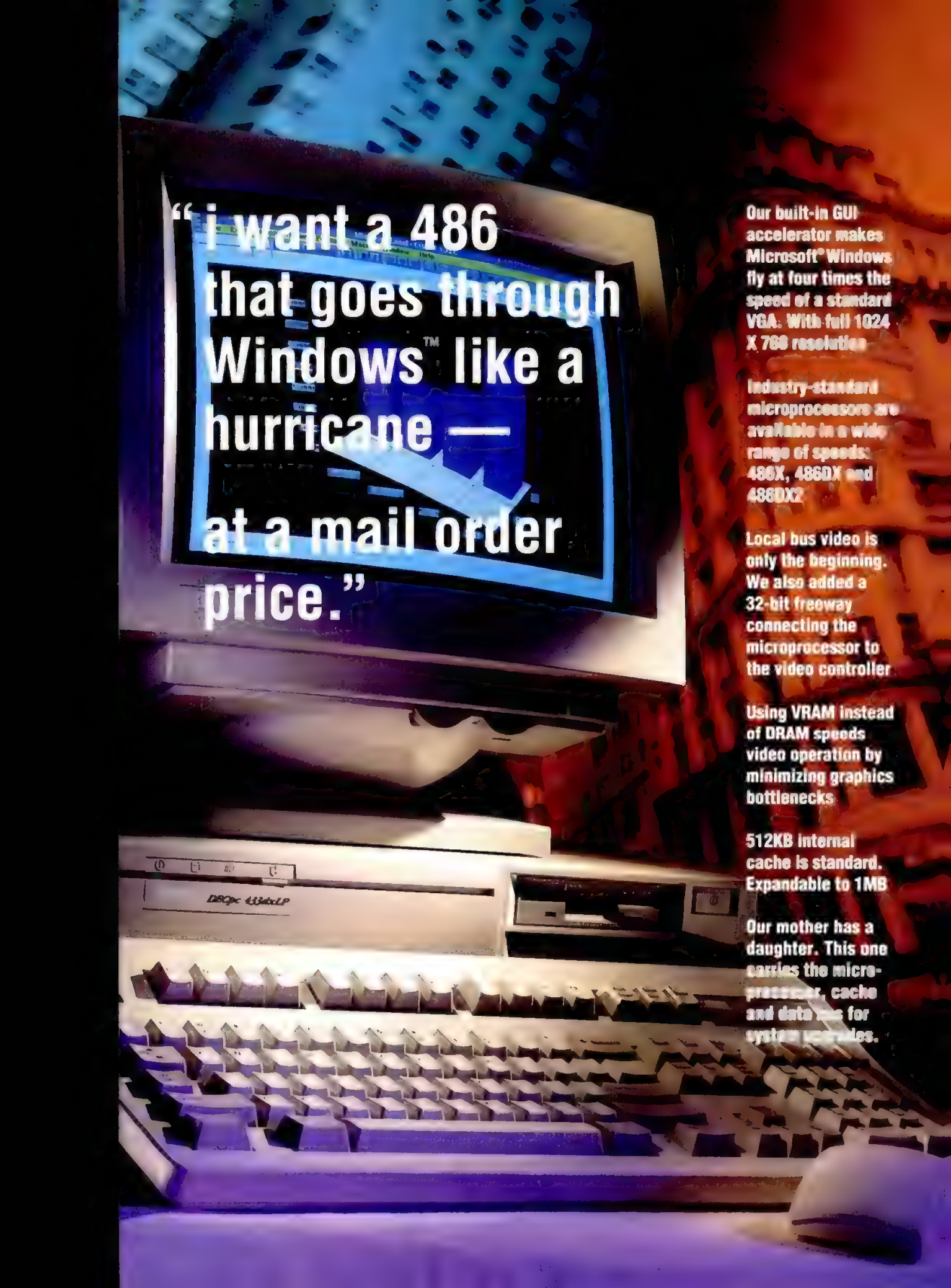
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Benchmark Tests: The DECpc 450d2 LP

We tested the clock-doubled 50-MHz DECpc 450d2 LP, one of six machines in Digital's new DECpc LP series, and found that its implementation of local-bus video yields outstanding results on our Graphics Winmark benchmark test.

We used PC Magazine Labs' Hardware Performance Tests Release 6.0, to measure each PC's performance. The Graphics Winmark is the geometric mean of 12 Windows-based graphics tests from WINBENCH 2.5, weighted to reflect how frequently various functions are used.

Higher scores represent better performance.	Processor (operations per second)	Memory (kilobytes per second)	Disk (kilobytes per second)	Video (thousands of operations per second)	Graphics Winmark (megapixels per second)
DECpc 450d2 LP (486DX2/50)	506	5,406	193	2,182	12.98
50-MHz 486DX2 average	487	6,430	276	2,539	5.51
Dell System 486D/50 (486DX2/50)	450	5,525	241	4,272	1.58



November 24, 1992



DECpc 433dx LP

- i486DX 33MHz System
- 128KB Writeback Cache
- 4MB RAM
- 122MB IDE Hard Drive
- 14" VGA Color Monitor
- 3.5" 1.44MB Floppy Drive
- Keyboard and Mouse
- MS-DOS 5.0 & Windows 3.1

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DECpc 450d2 LP

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- 4MB RAM
- 122MB IDE Hard Drive
- 14" VGA Color Monitor
- 3.5" 1.44MB Floppy Drive
- Keyboard and Mouse
- MS-DOS 5.0 & Windows 3.1

\$2,349



DECpc 466d2 LP

- i486DX2 66MHz System
- 128KB Writeback Cache
- 4MB RAM
- 122MB IDE Hard Drive
- 14" VGA Color Monitor
- 3.5" 1.44MB Floppy Drive
- Keyboard and Mouse
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— PC Computing, January, 1993

Scoreboard

Based on a scale of 1-5 (5=excellent)

	Advanced Logic Research Inc. Flyer 3207 40X/33	AST Research Inc. Bravo 4/33 Model 123B	Dell Computer Corp. Dimension 486DX/33	Digital Equipment Corp. DECpc 433dx LP	IBM PC Co. PS/1 Model 2155-S7B	Zenith Data Systems Z-433DX Model 200
Overall weighted score	3.6	3.5	2.4	4.0	2.8	3.4
1. Price vs. performance (30%)	4	4	2	4	3	4
2. Performance (25%)	3	4	2	4	3	3
3. Expandability (25%)	4	3	3	4	2	3
4. Serviceability (10%)	3	3	2	4	3	4
5. Quality of construction (10%)	3	2	3	4	3	3

1. Overall performance relative to cost (comparative among these six machines). 2. Overall comparative system performance in all tests. 3. Support for processor, memory, storage and expansion board upgrades. 4. Ease of processor, memory, storage and expansion board upgrades. 5. How well the system is assembled (including case design, power supply and tools required for assembly).

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- 3.5" 1.44MB Floppy Drive
- Removable trackball
- 6.5 hour battery

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■ Inside Ethernet

by Frank J. Derfler, Jr.

Ethernet has seen some changes. After several evolutions, the latest version of Ethernet is described by the IEEE (Institute of Electrical and Electronics Engineers) in the 802.3 family of standards. Technically, the 802.3 standards differ slightly from what's known as the "Blue Book" Ethernet specifications. But the 802.3 specifications are now commonly referred to simply as "Ethernet," and that is how we refer to them throughout this feature.

The 802.3 specifications define a message as a packet or frame consisting of 64 to 1,526 bytes of information. A data field in the frame holds roughly 1,500 bytes, and the remaining bytes carry the destination address, source address, error-control codes, and network control information.

Nodes on an Ethernet network share the cable by using a media-access control scheme called carrier-sense multiple-access with collision detect (CSMA/CD). Under CSMA/CD, a node may transmit only when the cable

is silent, ensuring that only one node can transmit at a time.

If two nodes start to transmit simultaneously, they detect the data collision and stop their transmissions; each node then uses a random-number generator to determine how long it must wait before attempting to transmit again. (The waiting period is called the back-off time.)

The CSMA/CD protocol is a technique that can be used with a variety of media. Currently there are Ethernet specifications for using unshielded twisted-pair (UTP) cabling (10BaseT), fiber-optic cabling (10BaseF), thick-coaxial cabling (10Base5), and thin-coaxial cabling (10Base2). NCR Corp. also uses the CSMA/CD protocol in its WaveLAN

wireless networking system.

The only practical limitation to CSMA/CD is that all nodes must hear a part of the frame at the same instant, thus imposing a maximum size on an

Ethernet network. (For information on the Token-Ring media-access control scheme, see "Around the Token-Ring," *PC Magazine*, October 13, 1992.)

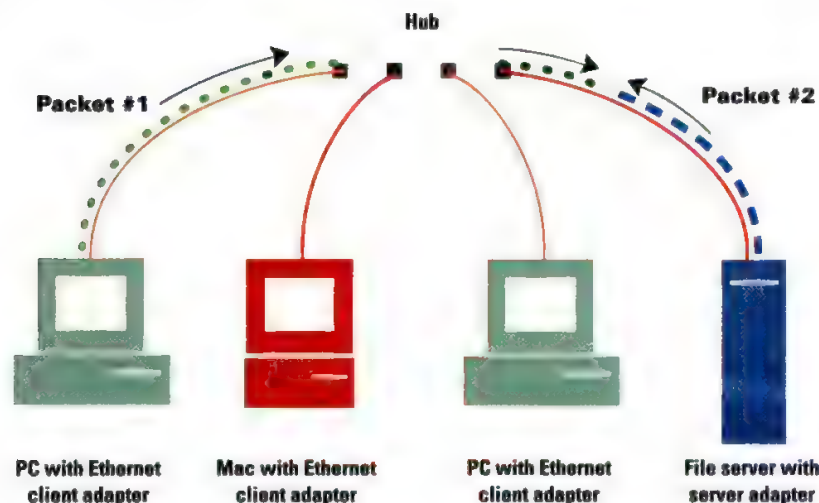
In the majority of installed Ethernet nodes, thin-coaxial cable (called thin Ethernet or

Cheapernet cable) connects to each node in a daisy-chain fashion. At each node, a T-shaped connector provides an attachment for the node, while preserving the continuity of the cable. Each T-shaped connector requires two strong cable connections because the weight of the cables puts a lot of strain on the whole structure. Unfortunately, if any single connector fails, the entire network then stops working.

The adapters we reviewed all support the 10BaseT specification. 10BaseT uses unshielded twisted-pair wire to connect each node to a port on a central wiring hub. The wiring hub in turn connects those ports.

The advantage of this scheme is that one bad connector or cable cannot disable the entire network, because the hub isolates the cable runs. In addition, this scheme makes adding users to the network easier; simply plug a client-attached cable into a hub port. With Cheapernet, you would have to splice the cable into order to add the T-shaped connector to the network. A hub, however, adds at least \$50 per node to the cost of a network. (For a more detailed discussion of wiring hubs, see "Empire Builders: 6 Enterprise Hubs," November 10, 1992). □

One advantage of the 10BaseT specification is that one bad cable can't disable the entire network, because hubs isolate cable runs.



To avoid transmission conflicts, Ethernet uses a control scheme. Stations normally transmit only when the cable is free. But here, the PC on the left and the file server transmit simultaneously, causing a collision. Each station must then retrieve the frame and wait for a random period before retransmitting.

Ethernet networks transmit packets ranging from 64 bytes to 1,526 bytes. Our tests measure how well the adapters we review handle the common packet sizes of 64, 512, and 1,024 bytes. Some adapters are more efficient at moving smaller packets; others perform best with larger frames.

HOW WE TESTED

These tests were performed at ZD Labs in Foster City, California. We created two test-beds for measuring the performance of server and client adapters. Each test-bed had a Compaq Deskpro 486/33M with 12MB of RAM acting as a NetWare 3.11 file server; we used the same model Deskpro with 8MB of RAM for each client station.

Server Test-bed

Because networks require increasingly large bandwidths, many network managers are conserving bandwidth by placing client stations on separate segments. To avoid burdening the entire system, the servers connected to these segments need network adapters that use CPU cycles efficiently.

To measure each adapter's effectiveness at connecting the server to multiple segments, we used each of the server adapters to attach the server to an Ethernet network; then we added network segments until four were connected. We attached a client PC with an Eagle NE2000T adapter to each segment. Each client ran the Network Throughput test, while the server measured CPU utilization with STAT.NLM.

Client PC Test-bed

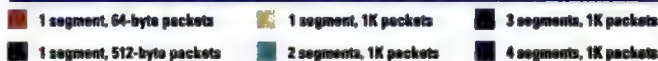
For the client PC test-bed, we connected the server to one segment. In the server, we installed the Gateway G/Ethernet 32EB, the card with the highest single-segment throughput among the server cards we tested. We tested each adapter in the client PC by running the Network Throughput test.

The **Network Throughput** test measures the amount of data an adapter can transmit over the network. We installed each vendor's adapters in the server and client PC, and we used NetBench to send data frames of 64, 256, 512, and 1,024 bytes across the network. (Because it also contains some standard information, each Ethernet frame is actually slightly larger.) The maximum throughput that Ethernet adapters can produce is 10 megabits per second. The ratio of the network throughput to maximum throughput is the network utilization.

The **CPU Utilization** test measures the amount of overhead the adapter adds to the server, particularly under heavy traffic loads. We use NetWare's STAT.NLM, which reports this overhead as a percentage of total CPU usage. We ran separate versions of the test with one, two, three, and four adapters installed in the server, reporting CPU utilization for each configuration.

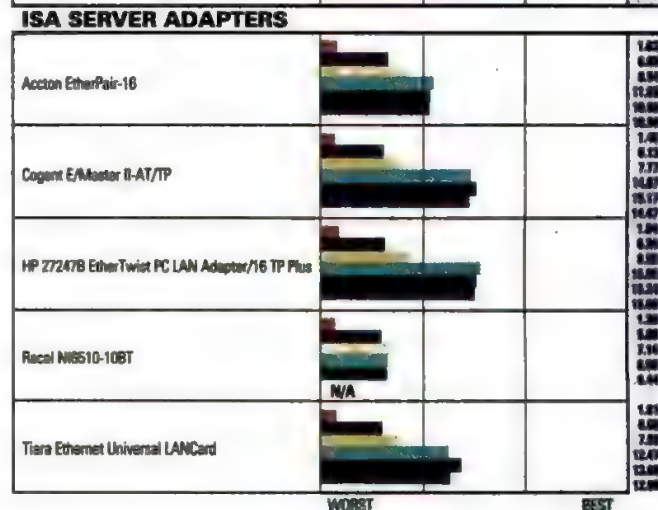
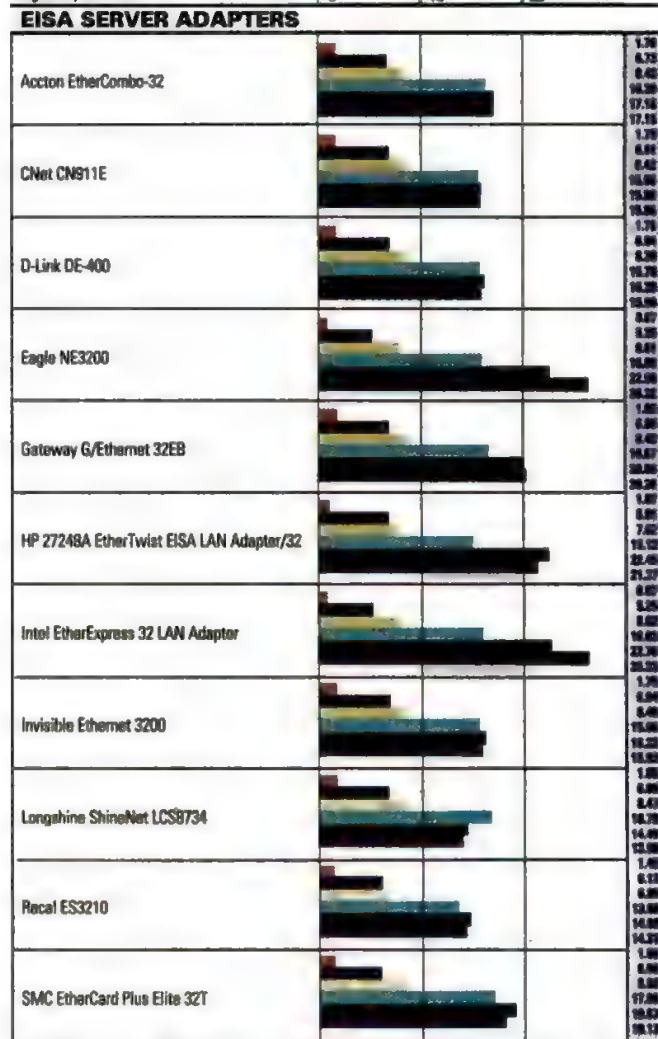
The **Performance Index (PI)** represents the ratio of network utilization to CPU utilization; high throughput at the expense of a crippled server would clearly be undesirable. We give each adapter a network-utilization rating based on the Network Throughput test score, on a scale where 10 megabits per second would become a rating of 100. We then divide this score by the CPU Utilization test score to determine the performance index. The higher the number, the better the adapter.

NETWORK THROUGHPUT



Megabits per second

0 10 20

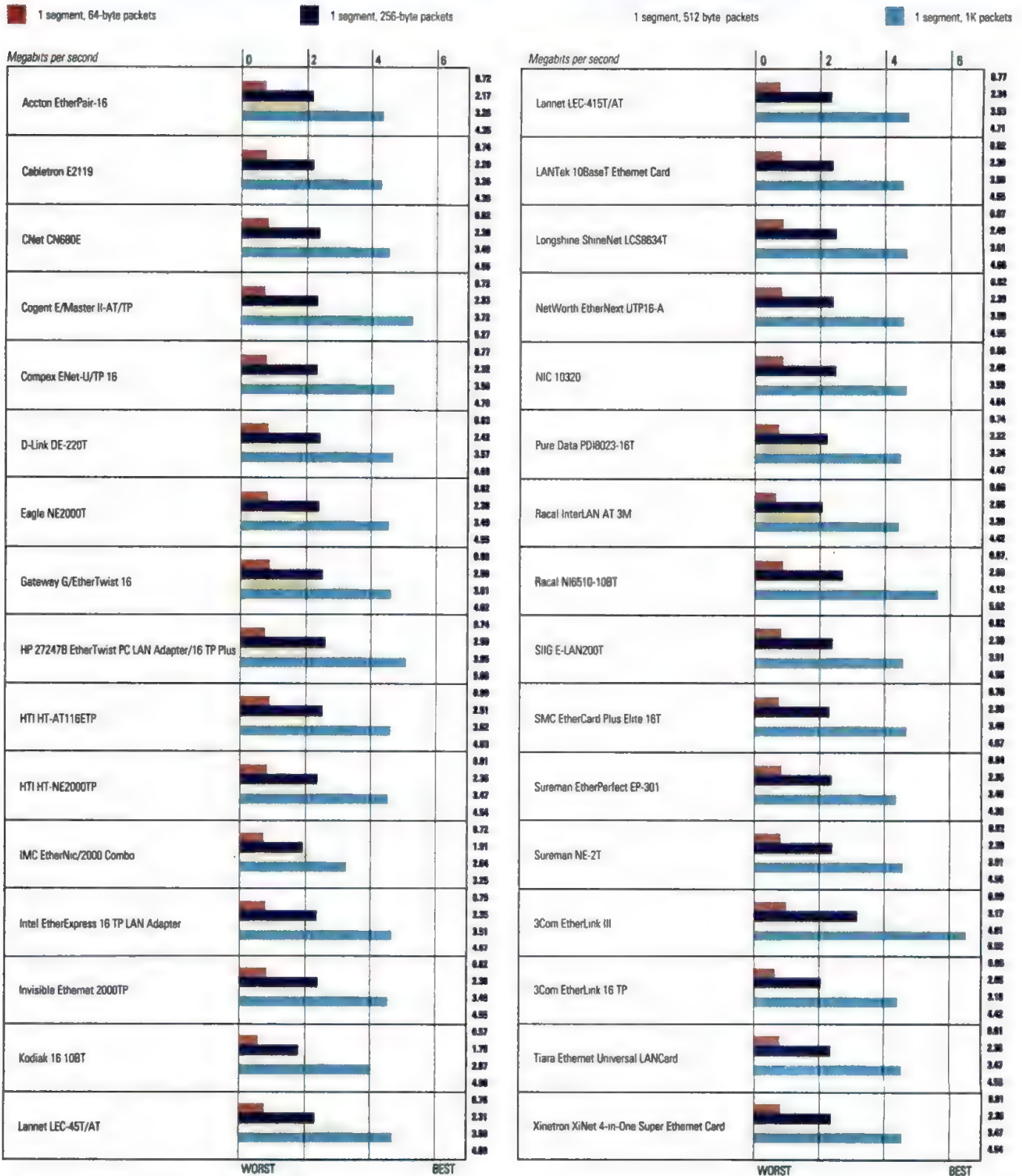


Worst Best

N/A—Not applicable: The card driver does not support four cards in the server.

NETWORK THROUGHPUT

CLIENT ADAPTERS



N/A—Not applicable. The card driver does not support four cards in the server.

CPU UTILIZATION

■ 1 segment, 64-byte packets ■ 1 segment, 1K packets ■ 3 segments, 1K packets
■ 1 segment, 512-byte packets ■ 2 segments, 1K packets ■ 4 segments, 1K packets

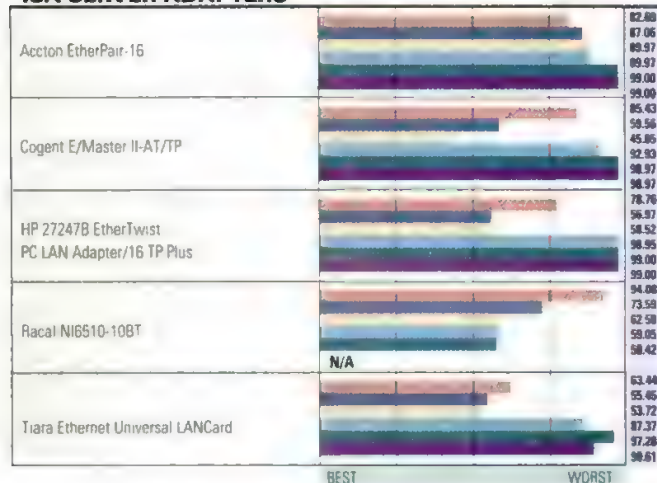
Percentage of CPU usage

0 25 50 75

EISA SERVER ADAPTERS



ISA SERVER ADAPTERS



N/A—Not applicable. The card driver does not support four cards in the server.

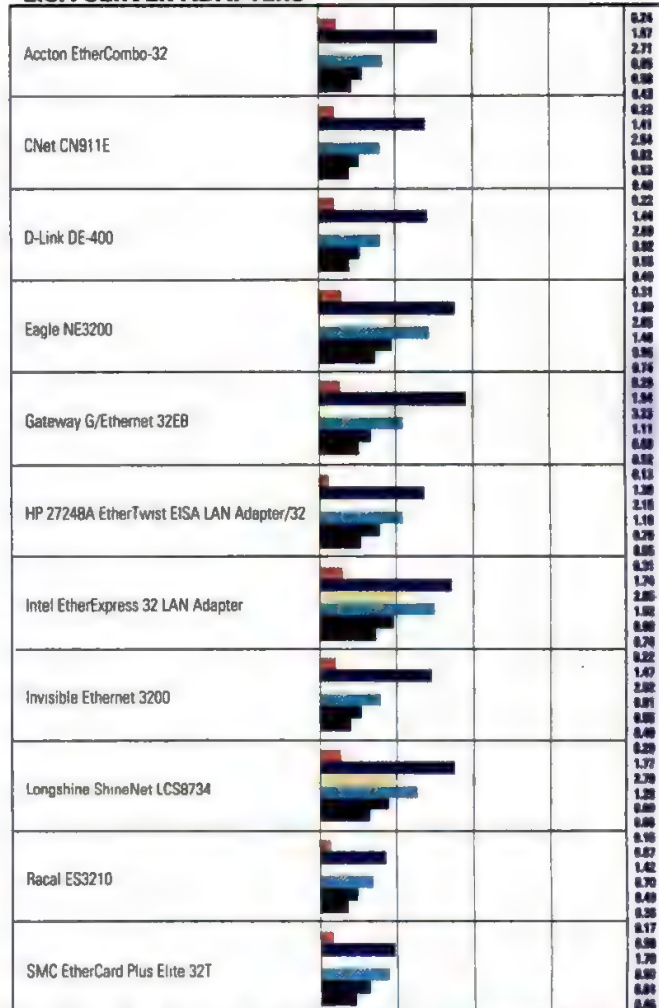
PERFORMANCE INDEX

■ 1 segment, 64-byte packets ■ 1 segment, 1K packets ■ 3 segments, 1K packets
■ 1 segment, 512-byte packets ■ 2 segments, 1K packets ■ 4 segments, 1K packets

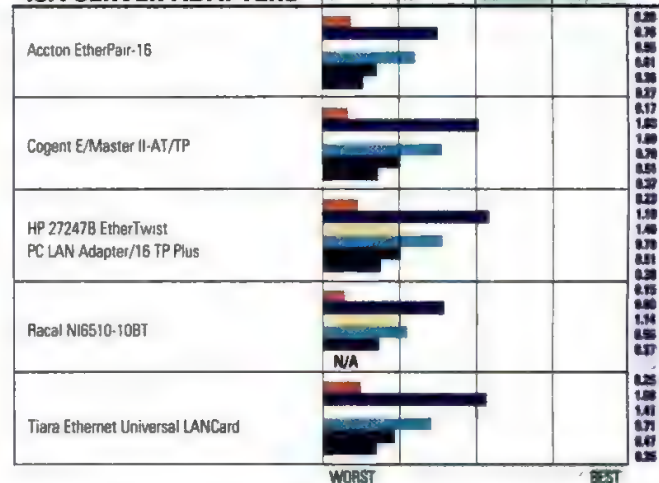
Ratio of network utilization to CPU utilization

0 1 2 3

EISA SERVER ADAPTERS



ISA SERVER ADAPTERS



N/A—Not applicable. The card driver does not support four cards in the server.

Ethernet Adapters

with 1K packets. The CN680E's throughput was identical to that of the Eagle NE2000T.

The CN911E is configurable through software, but the CN680E is set with jumpers. We also had to download a new driver from CNet's BBS to complete our tests. CNet covers both adapters with a five-year warranty and decent documentation.

The CN911E, with its low price and good performance, should be fine for moderate network traffic. The CN680E is an almost exact clone of the NE2000T.

• CNet CN680E, CNet CN911E

CNet Technology Inc., 2199 Zanker Rd., San Jose, CA 95131; 800-486-2638, 408-954-8000; fax, 408-954-8866.

List price: CN680E, \$239; CN911E, \$499.

Circle 466 on reader service card

Cogent Data Technologies Inc.

Cogent E/Master II-AT/TP

BY STEVEN C.M. CHEN

Bus mastering is an unusual feature for an ISA Ethernet adapter, but the Cogent E/Master II-AT/TP has it. One of two reviewed ISA bus-mastering adapters, the \$498 Cogent is one of the most expensive ISA units, making it most suitable for one-segment LANs and large budgets.

As a client card, the Cogent did poorly when handling 64-byte packets. It was more efficient at handling 1K packets, achieving one of the highest throughputs.

The Cogent had some of the best performance indexes of the tested ISA server adapters. Although not the fastest card, its bus mastering provided some of the better CPU utilization scores among the 16-bit adapters. However, the Cogent didn't fare well with more than one adapter installed.

The company's thorough documentation covers both hardware and software, but setup can be difficult. Unlike other server adapters, the Cogent requires the same I/O address for each adapter, while the DMA (direct memory access) and IRQ jumper settings need to be unique.

The Cogent is an above-average client adapter with a high price. It can function well as a server adapter, provided that network traffic is moderate.

• Cogent E/Master II-AT/TP

Cogent Data Technologies Inc., 175 West

St., Box 926, Friday Harbor, WA 98250; 800-426-4368, 206-378-2929; fax, 206-378-2882.

List price: \$498.

Circle 467 on reader service card

Compex Inc.

Compex ENet-U/TP 16

BY STEVEN C.M. CHEN

Versatile accurately describes the Compex ENet-U/TP 16: This \$159 ISA card can emulate four popular adapters.

The Compex was particularly effective at processing large packets. Throughput with 1K 512-byte packets slightly trailed that of the leaders, and its performance with 512-byte packets was average. Its throughput with 256-byte and 64-byte packets was slightly below the Eagle NE2000T's. Of the Compex's four modes—Compex, SMC EtherCard Plus 16, and Eagle NE1000 and NE2000—we tested its default, Compex mode.

You configure the Compex through jumpers. The company added a plastic

pull tag to the jumpers, but this method doesn't compare with software configuration. The manual describes the hardware

Bus-mastering is unusual in an ISA adapter, but the Cogent E/Master has it.

installation, and it covers three different Compex adapters and four adapter modes without clearly separating the topics.

Nevertheless, with its five-year warranty, multiple adapter emulations, low price, and average throughput, the Compex is a flexible solution for many networks.

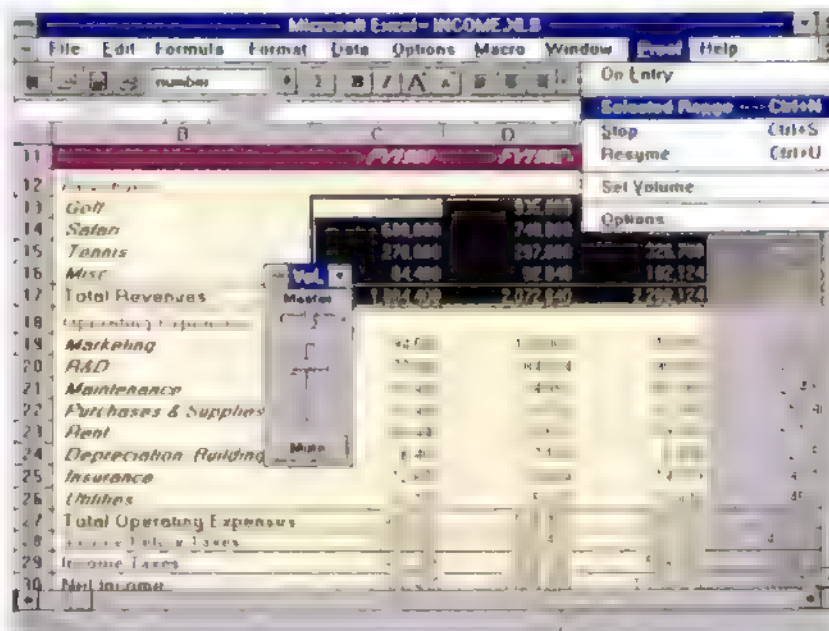
• Compex ENet-U/TP 16

Compex Inc., 4055 E. La Palma Ave., Unit C, Anaheim, CA 92807; 714-630-7302; fax, 714-630-6521.

List price: \$159; package of six, \$834.

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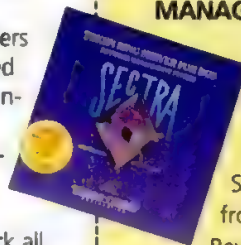
♦ **Think compatibility.** Our 802.5 compliant token ring products give you the compatibility you need to work in mixed-vendor environments. And our entire suite of comprehensive driver software is developed in-house, so you're assured of instantaneous upgrades that keep pace with the latest network operating system advances.

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CIRCLE 330 ON READER SERVICE CARD

Ethernet Adapters

D-Link Systems Inc.

D-Link DE-220T

D-Link DE-400

BY STEVEN C.M. CHEN

Small can be beautiful. D-Link Systems provides an inexpensive little adapter for ISA machines and a reasonably priced, larger adapter for EISA servers.

The \$145 D-Link DE-220T is a low-priced Eagle NE2000-compatible. The D-Link DE-400 is a \$695 EISA-based server or client bus-mastering adapter.

The ISA-based DE-220T is one of the smallest client adapters we tested, and it provides only an RJ-45 connector. Unlike most NE2000 compatibles, the DE-220T's throughput was slightly better than the Eagle NE2000T's.

The modestly priced bus-mastering DE-400 also offers modest server throughput. With a performance index of 2.69, it was most effective on our one-segment test with 1K packets.

D-Link's manuals are thin, and contrary to what the DE-400's manual says, you select the IRQ settings manually; the default is IRQ 3. You use software to configure the jumperless DE-220T.

The DE-220T's low price, software configuration, and good throughput make it a perfect NE2000 replacement. The DE-400 should be fine for any single-segment network with moderate traffic.

• D-Link DE-400

D-Link Systems Inc., 5 Musick, Irvine, CA 92718; 800-326-1688, 714-455-1688; fax, 714-455-2521.

List price: DE-220T, \$145; package of six, \$599. DE-400, \$695.

Circle 469 on reader service card

Eagle Technology

Eagle NE2000T

Eagle NE3200

BY TONY POMPILI

Why kill a good thing? Eagle Technology's legendary 16-bit ISA Eagle NE2000T, and now its 32-bit EISA NE3200, remain the baselines by which all competitors are judged. Originally sold by Novell, the NE2000T remains one

of the most dominant Ethernet client adapters.

The NE2000T is hardware-configurable, with an RJ-45 network interface. Two LEDs give link and polarity information. The company also recently introduced a new software-configurable

**Eagle Technology's
NE2000T and NE3200
are the baselines by which
all competitors are judged.**

Eagle NE2000, the NE2000+3, which offers AUI, RJ-45, and BNC connectors.

Not surprisingly, with 28 adapters using nearly identical hardware and drivers, the NE2000T's performance was average. The NE3200, however, performed extremely well on our multisegment tests. On the single-segment tests, the NE3200 slightly trailed even some 16-bit cards.

At \$995, the NE3200 is a great card for networks with multiple segments. The proven \$235 NE2000T, while not glitzy, is still a strong client adapter.

• Eagle NE2000T, Eagle NE3200
Eagle Technology, A Division of Anthem Electronics Inc., 1160 Ridder Park Dr., San Jose, CA 95131; 800-733-2453, 408-441-7453; fax, 408-441-4030.

List price: NE3200, \$995; NE2000T, \$235; package of five, \$1,063.

Circle 470 on reader service card

LANtek Computer Inc.

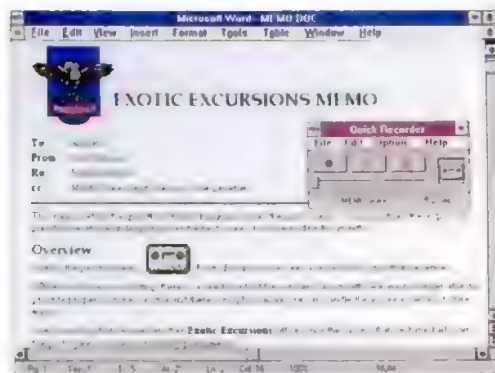
LANtek 10BaseT Ethernet Card

BY TONY POMPILI

The 10BaseT Ethernet Card is guaranteed for life. Only a few vendors in this review offer such a warranty.

Priced at \$109, the LANtek makes a much smaller dent in your wallet than do most Ethernet adapters. Combined with average performance and adequate driver support, this Eagle NE2000-compatible ISA client adapter is a good

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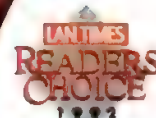
■ UL, CSA and Novell approved with a 2 year warranty

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1991, 1990



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Model	Application	List	New List
Back-UPS 250	LAN nodes, 386SX, 286, internet hardware, POS	\$169	\$139
Back-UPS 400	Desktop 386, 486 systems, 286 servers	\$249	\$229
Back-UPS 450	Tower 386, 486 systems, servers	\$279	\$279
Back-UPS 600	Heavily configured systems, CAD/CAM workstations	\$449	\$399
Back-UPS 900	Multiple systems, longer runtime applications		\$599
Back-UPS 1250	Multiple systems, LAN hubs, small minis, telecom equipment		\$799

**NEW
NEW!**

Ethernet Adapters

choice for small, low-budget networks.

Its performance slightly edged out that of the Eagle NE2000T, putting it on a par with more expensive client cards.

The LANtek includes 16K of RAM, along with RJ-45 and AUI connectors, but no BNC connectors or LEDs. You set the card's interrupt and memory addresses through the hardware.

The documentation provides clear jumper setting instructions and includes directions for generating a NetWare .IPX driver. It would have been nice to see a technical support number in the manual, since the company's name and address aren't anywhere to be found.

If price is the deciding factor, and average performance will suffice, the LANtek is certainly worth considering.

• LANtek 10BaseT Ethernet Card
LANtek Computer Inc., 661 Brea Canyon Rd., #3, Walnut, CA 91789; 800-462-0436, 714-594-9491; fax, 714-594-6490.

List price: \$109.

Circle 471 on reader service card

Gateway Communications Inc.

Gateway G/Ethernet 32EB

Gateway G/EtherTwist 16

BY STEVEN C.M. CHEN

Gateway Communications has the right adapter for a server attached to only one or two networks: the Gateway G/Ethernet 32EB. This \$800 high-speed server adapter complements Gateway's \$190 client adapter, the Gateway G/EtherTwist 16.

The G/Ethernet had the highest performance index on our one-segment test with 512-byte packets, because of its optimized driver and burst-mode feature, which lets the adapter use CPU cycles to transfer data. And it did an excellent job on our two-segment test. When we added more segments, CPU utilization increased to 97 percent.

The G/EtherTwist's throughput was slightly above-average. It employs jumpers for all settings, while the G/Ethernet uses basic EISA installation software.

The G/EtherTwist comes with a single card containing installation directions. The G/Ethernet comes with a full manual, and both include an on-disk manual.

If you plan to install only one or two

adapters per server, the G/EtherTwist is a good choice, while the G/Ethernet can handle many demanding environments.

• Gateway G/Ethernet 32EB, Gateway G/EtherTwist 16

Gateway Communications Inc., 2941 Alton Ave., Irvine, CA 92714; 800-367-6555, 714-553-1555; fax, 714-553-1616.

List price: G/EtherTwist 16, \$190; package of five, \$900; package of ten, \$1,750. G/Ethernet 32EB, \$800.

Circle 472 on reader service card

Hewlett-Packard Co.

HP 27247B EtherTwist PC LAN

Adapter/16 TP Plus

HP 27248A EtherTwist EISA LAN

Adapter/32

BY STEVEN C.M. CHEN

Both of Hewlett-Packard Co.'s two cards use different techniques to improve performance and save you money. The

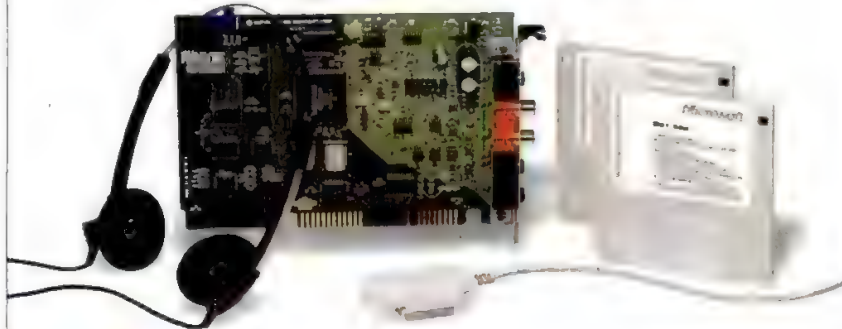
\$225 HP 27247B EtherTwist PC LAN Adapter/16 TP Plus is a high-performance ISA client and server adapter. The \$595 HP 27248A EtherTwist EISA LAN Adapter/32 is an inexpensive EISA server card but offers variable performance.

The PC version was one of the fastest ISA client adapters, but its driver made it fall behind the Eagle NE2000T on our test with 64-byte packets. As a server adapter, this card had the second-highest performance index among ISA-based server cards. It supports memory-mapped and I/O data transfer.

The EISA adapter uses lower-cost burst-mode DMA instead of bus mastering, which meant low throughput on one-segment servers, but raised it on three and four segments. For single segments, its CPU utilization was higher than the average; its performance index was middling.

You use software to configure these adapters. Both provide clear documentation and lifetime warranties. The PC version should be on top of your client

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NETWORKING

Ethernet Adapters

adapter list and is worth considering for small-network servers.

• **EDITORS' CHOICE ▶** HP 27247B EtherTwist PC LAN Adapter/16 TP Plus, HP 27248A EtherTwist EISA LAN Adapter/32

Hewlett-Packard Co., 8000 Foothills Blvd., Roseville, CA 95747; 800-752-0900; fax, 208-344-4809.

List price: PC version, \$225; package of six, \$1,195. EISA version, \$595.

Circle 473 on reader service card

HTI Networks

HTI HT-AT116ETP

HTI HT-NE2000TP

BY TONY POMPILI

The \$195 HTI HT-AT116ETP and \$175 HTI HT-NE2000TP have decent prices and slightly above-average performance. The HT-NE2000TP provides basic NE2000 compatibility; the HT-AT116ETP comes with its own drivers, more on-board RAM, and a few more features.

These two cards are mostly suitable as client adapters for small networks. The HT-NE2000TP is a no-frills Eagle NE2000 replacement board for ISA-bus PCs. The HT-AT116ETP ISA-bus adapter adds 64K of RAM and three external LEDs.

On our tests, the HT-AT116ETP's performance was above average when transmitting 512-byte packets. The HT-NE2000TP was slower than its sibling, but it was a respectable performer throughout the various test versions.

Both cards use jumpers for configuration. The slim documentation focuses on the jumper settings, and has a small section describing driver installation.

Providing slightly better performance than the industry-standard NE2000 adapters, these boards are reasonable choices for experienced LAN administrators.

• HTI HT-AT116ETP, HTI HT-NE2000TP

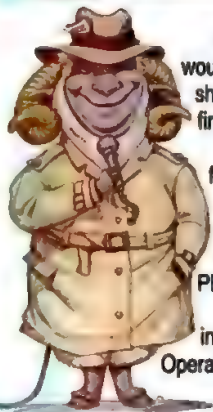
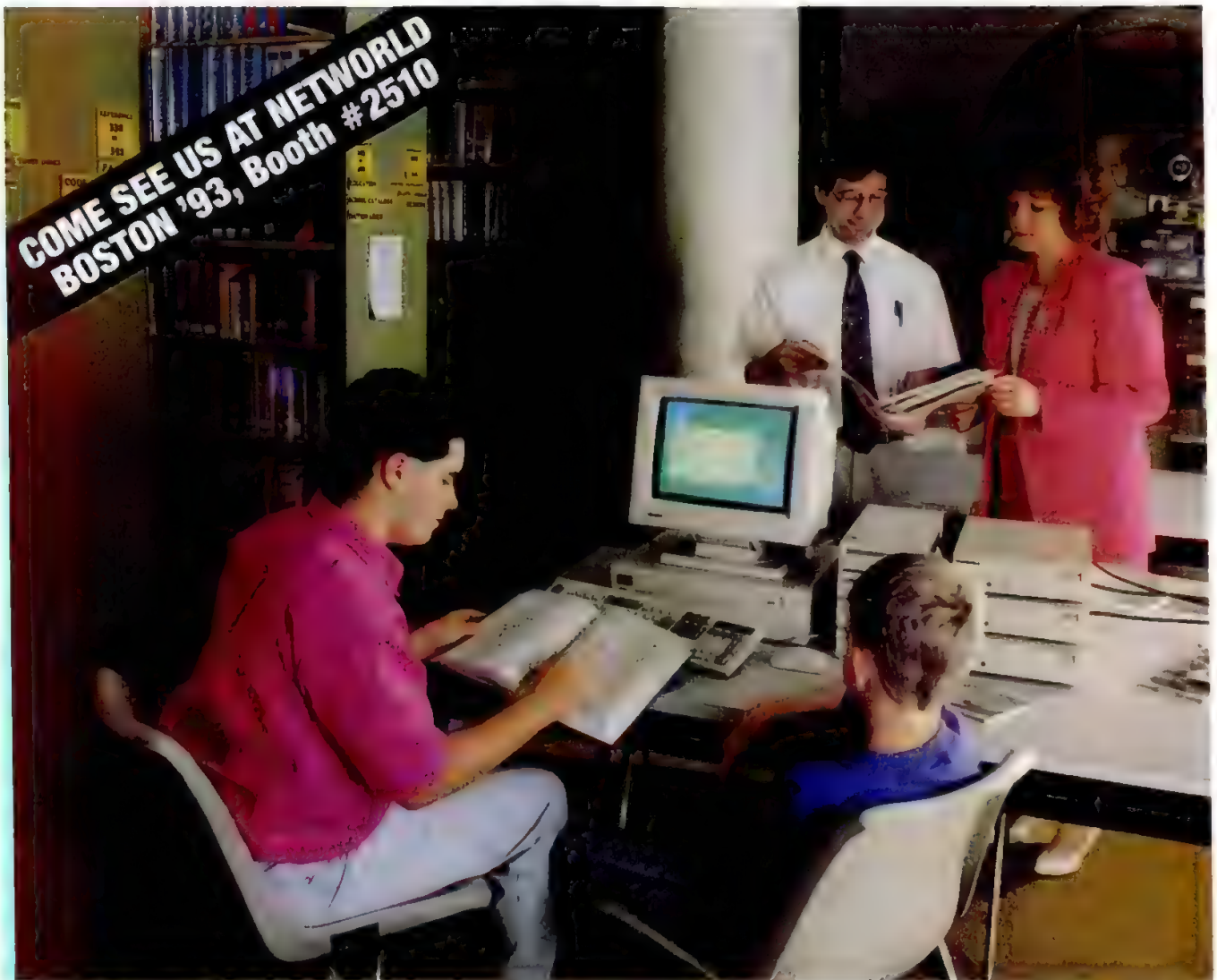
HTI Networks, 532 Weddell Dr., #1, Sunnyvale, CA 94089; 408-745-0100; fax, 408-745-7711.

List price: HT-AT116ETP, \$195; HT-NE2000TP, \$175.

Circle 474 on reader service card

"LANtastic wrote the book on easy CD-ROM networking"

- ACCESS PENNSYLVANIA



THE BIG SWITCH INTERVIEW #9

as THE network solution not only for libraries of all types, but as the network solution for all purposes."

For more information, call 1-800-TINY RAM, ext. 600. We'll tell you all about the LANtastic networking system, the award-winning leader in peer-to-peer networking for DOS and Windows™ environments. We'll also send you a free demo disk and refer you to the Artisoft Authorized Five Star™ reseller near you.

ACCESS PENNSYLVANIA needed a computer network that would allow hundreds of school and public libraries across the state to share CD-ROMs, printers and other peripherals. Their goal was to find one that was reliable, affordable, feature-rich and easy to use.

The ACCESS PENNSYLVANIA Database was organized and funded by the Pennsylvania Department of Education and the State Library. "(It) represents the largest CD-ROM union catalogue installation in the world, with more than 1,000 libraries," says Charlene M. Scheib, director of ACCESS PENNSYLVANIA Support.

After months of investigating and testing many systems, including NetWare®, they homed in on the LANtastic Network Operating System.

Why? Ms. Scheib explains: "We chose LANtastic for several reasons: LANtastic is cost-effective, easy to install, requires little technical support and provides quick, direct access to CD-ROM mass-storage devices. We see LANtastic

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LAN TIMES
READERS
CHOICE
1992

PC
MAGAZINE
EDITORS'
CHOICE
April 14, 1992
LANtastic, Version 4.10

MAGAZINE
OF THE YEAR
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CIRCLE 254 ON READER SERVICE CARD

NETWORKING
Ethernet Adapters

► SUMMARY OF FEATURES

Ethernet Adapters

In alphabetical order by company ■ = YES □ = NO		Accton Technology Corp. Accton EtherCombo-32	Accton Technology Corp. Accton EtherPair-16	Cabletron Systems Inc. Cabletron E2119	CNet Technology Inc. CNet CN680E	CNet Technology Inc. CNet CN911E	Cogent Data Technologies Inc Cogent E/Master II-AT/TP
List price		\$499	\$189	\$2,300 (package of 20)	\$239	\$499	\$495
Adapter type		Server	Client	Client	Client	Server	Client/server
Bus architecture		EISA	ISA	ISA	ISA	EISA	ISA
Bus interface (bits)		32	16	16	16	32	16
Warranty		1 year	1 year	1 year	5 years	5 years	1 year
Physical Characteristics							
Connectors		AUI, BNC, RJ-45	AUI, RJ-45	RJ-45	AUI, BNC, RJ-45	AUI, BNC, RJ-45	AUI, RJ-45
Hardware or software configuration settings		Software	Software	Software	Hardware	Software	Hardware
Amount of RAM on-board		None	16K	16K	16K	None	None
Remote Program Load (RPL) support		Optional	Optional	■	Optional	Optional	Optional
Status lights		■	■	■	■	■	■
SNMP agent		□	□	■	□	□	□
Operating Systems Supported							
Microsoft Windows 3.1		■	■	■	■	■	■
OS/2		■	■	■	■	■	■
Unix		■	■	■	■	■	■
Drivers Supported							
LAN Server		■	□	□	□	□	□
LANtastic		□	■	□	■	□	□
Microsoft LAN Manager		■	■	■	■	■	■
NetBIOS		□	■	■	■	□	■
NetWare 2.x		■	■	■	■	■	■
PathWorks		■	■	■	■	□	■
PowerLAN		□	■	□	□	□	□
Data-Transfer Technique							
Bus mastering		■	□	□	□	■	■
DMA		□	□	□	□	□	□
Programmed I/O		□	■	□	■	□	□
Shared memory		□	□	■	□	□	□
Other Ethernet Products							
Ethernet-to-Ethernet bridge		■	■	□	□	□	□
Ethernet-to-Token-Ring bridge		□	□	□	■	□	□
Macintosh adapter		□	□	□	■	□	□
Wiring hub		■	■	■	■	□	□

NETWORKING
Ethernet Adapters

Compex Inc.	D-Link Systems Inc.	D-Link Systems Inc.	Eagle Technology	Eagle Technology	Gateway Communications Inc.	Gateway Communications Inc.	 Hewlett-Packard Co.	Hewlett-Packard Co.
Compex ENet-U/TP 16	D-Link DE-220T	D-Link DE-400	Eagle NE2000T	Eagle NE3200	Gateway G\ Ethernet 32EB	Gateway G\ EtherTwist 16	HP 27247B EtherTwist PC LAN Adapter/ 16 TP Plus	HP 27248A EtherTwist EISA LAN Adapter 32
\$159	\$145	\$695	\$235	\$995	\$800	\$190	\$225	\$595
Client	Client	Server	Client	Server	Server	Client	Client/server	Server
ISA	ISA	EISA	ISA	EISA	EISA	ISA	ISA	EISA
16	16	32	16	32	32	16	16	32
5 years	5 years	5 years	5 years	5 years	5 years	5 years	Lifetime	Lifetime

AUI, RJ-45	RJ-45	AUI, BNC, RJ-45	RJ-45	AUI, BNC	AUI, BNC, RJ-45	RJ-45	AUI, RJ-45	AUI, RJ-45
Hardware	Software	Software	Hardware	Software	Hardware, software	Hardware	Software	Software
16K	16K	64K	16K	48K	None	32K	32K	64K
Optional	Optional	Optional	Optional	☐	☒	☐	Optional	Optional
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IF YOU WANT TO KNOW ABOUT PORTABLES



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VGA color LCD 8.5" diagonal screen (640x480)
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1 parallel, 1 serial, external keyboard and VGA ports
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82-key keyboard emulates 101-key layout
11.6" x 8.2" x 1.8"

Travel weight under 7 pounds

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\$2595

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CIRCLE 126 ON READER SERVICE CARD

NETWORKING
Ethernet Adapters

► **S U M M A R Y O F F E A T U R E S**

In alphabetical order by company ☒ = YES ☐ = NO							
	HTI Networks HTI HT-AT116ETP	HTI Networks HTI HT-NE2000TP	IMC Networks Corp. IMC EtherNic/2000 Combo	Intel Corp. Intel EtherExpress 16 TP LAN Adapter	PC EDITOR'S CHOICE Intel Corp. Intel EtherExpress 32 LAN Adapter	Invisible Software Inc. Invisible Ethernet 2000TP	
List price	\$195	\$175	\$240	\$179	\$795	\$299	
Adapter type	Client	Client	Client	Client	Server	Client	
Bus architecture	ISA	ISA	ISA	ISA	EISA	ISA	
Bus interface (bits)	16	16	16	16	32	16	
Warranty	5 years	5 years	5 years	3 years	3 years	2 years	
Physical Characteristics							
Connectors	AUI, RJ-45	AUI, RJ-45	AUI, BNC, RJ-45	DIX, RJ-45	AUI, BNC	BNC, DB-15, RJ-45	
Hardware or software configuration settings	Hardware	Hardware	Hardware	Software	Software	Hardware	
Amount of RAM on-board	64K	16K	16K	32K	48K	16K	
Remote Program Load (RPL) support	Optional	Optional	Optional	Optional	☐	Optional	
Status lights	☒	☒	☒	☐	☐	☒	
SNMP agent	☐	☐	☐	☒	☒	☐	
Operating Systems Supported							
Microsoft Windows 3.1	☐	☐	☒	☒	☒	☒	
OS/2	☒	☐	☒	☒	☐	☒	
Unix	☐	☐	☒	☒	☐	☒	
Drivers Supported							
LAN Server	☐	☐	☐	☒	☐	☒	
LANtastic	☐	☒	☒	☒	☒	☒	
Microsoft LAN Manager	☒	☐	☒	☒	☒	☒	
NetBIOS	☐	☒	☒	☐	☐	☒	
NetWare 2.x	☒	☒	☒	☐	☒	☒	
PathWorks	☐	☐	☒	☐	☐	☒	
PowerLAN	☐	☐	☐	☐	☐	☒	
Data-Transfer Technique							
Bus mastering	☐	☐	☐	☐	☒	☐	
DMA	☐	☐	☐	☐	☐	☐	
Programmed I/O	☒	☒	☒	☒	☐	☒	
Shared memory	☐	☐	☐	☒	☐	☐	
Other Ethernet Products							
Ethernet-to-Ethernet bridge	☐	☐	☐	☐	☐	☐	
Ethernet-to-Token-Ring bridge	☐	☐	☐	☐	☐	☐	
Macintosh adapter	☐	☐	☐	☐	☐	☐	
Wiring hub	☒	☒	☒	☐	☐	☒	

NETWORKING

Ethernet Adapters

Invisible Software Inc. Invisible Ethernet 3200	Kodiak Technology Inc. Kodiak 16 10BT	LanNet Data Communications LEC-45T/AT	LanNet Data Communications LEC-415T/AT	LANtek Computer Inc. LANtek 10BaseT Ethernet Card	Longshine Microsystems Inc. Longshine ShineNet LCS8634T	Longshine Microsystems Inc. Longshine ShineNet LCS8734	Network Interface Corp. NIC 10320
\$599	\$179	\$269	\$299	\$109	\$159	\$469	\$209
Server	Client	Client	Client	Client	Client/server	Client/server	Client
EISA	ISA	ISA	ISA	ISA	ISA	EISA	ISA
32	16	16	16	16	16	32	16
2 years	5 year	1 year	1 year	Lifetime	1 year	1 year	5 years

AUI, BNC, RJ-45	RJ-45	AUI, RJ-45	AUI, BNC, RJ-45	AUI, RJ-45	AUI, RJ-45	AUI, RJ-45	AUI, RJ-45
Software	Hardware	Hardware	Hardware	Hardware	Hardware	Hardware	Hardware
32K	64K	8K	8K	16K	16K	None	16K
Optional	Optional	Optional	Optional	Optional	☐	☐	Optional
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CONTINUES

NETWORKING

Ethernet Adapters

► SUMMARY OF FEATURES

In alphabetical order by company							
☒ = YES ☐ = NO	NetWorth Inc. NetWorth EtherNext UTP16-A	Pure Data Inc. Pure Data PDI8023-16T	Racal-Datcom Inc. Racal ES3210	Racal-Datcom Inc. Racal InterLAN AT 3M	Racal-Datcom Inc. Racal NI6510- 10BT	SIIG Inc. SIIG E-LAN200T	
List price	\$279	\$229	\$749	\$279	\$239	\$249	
Adapter type	Client	Client	Server	Client	Client	Client	
Bus architecture	ISA	ISA	EISA	ISA	ISA	ISA	
Bus interface (bits)	16	16	32	16	16	16	
Warranty	3 years	5 years	Lifetime	Lifetime	Lifetime	1 year	
Physical Characteristics							
Connectors	AUI, RJ-45	RJ-45	AUI, BNC	AUI, BNC, RJ-45	AUI, RJ-45	AUI, RJ-45	
Hardware or software configuration settings	Hardware	Hardware	Software	Hardware	Hardware	Hardware	
Amount of RAM on-board	16K	16K	16K	16K	None	16K	
Remote Program Load (RPL) support	Optional	Optional	☐	Optional	Optional	Optional	
Status lights	☒	☒	☐	☒	☒	☒	
SNMP agent	☐	☐	☒	☒	☒	☐	
Operating Systems Supported							
Microsoft Windows 3.1	☒	☒	☒	☒	☒	☒	
OS/2	☒	☒	☒	☒	☒	☒	
Unix	☒	☒	☒	☒	☒	☒	
Drivers Supported							
LAN Server	☐	☒	☒	☒	☒	☒	
LANtastic	☒	☒	☐	☒	☐	☒	
Microsoft LAN Manager	☒	☒	☒	☒	☒	☒	
NetBIOS	☐	☒	☐	☒	☐	☒	
NetWare 2.x	☒	☒	☒	☒	☒	☒	
PathWorks	☒	☒	☒	☒	☒	☐	
PowerLAN	☐	☒	☐	☐	☐	☐	
Data-Transfer Technique							
Bus mastering	☐	☐	☐	☐	☒	☐	
DMA	☐	☐	☒	☐	☐	☐	
Programmed I/O	☒	☐	☐	☐	☐	☐	
Shared memory	☐	☒	☒	☒	☐	☒	
Other Ethernet Products							
Ethernet-to-Ethernet bridge	☒	☐	☒	☒	☒	☐	
Ethernet-to-Token-Ring bridge	☐	☐	☐	☐	☐	☐	
Macintosh adapter	☐	☐	☒	☒	☒	☐	
Wiring hub	☒	☒	☒	☒	☒	☐	

NETWORKING
Ethernet Adapters



Standard Micro Systems Corp. SMC EtherCard Plus Elite 16T	Standard Micro Systems Corp. SMC EtherCard Plus Elite 32T	Sureman Computer Corp. Sureman EtherPerfect EP-301	Sureman Computer Corp. Sureman NE-2T	3Com Corp. 3Com EtherLink III	3Com Corp. 3Com EtherLink 16 TP	Tiara Computer Systems Inc Tiara Ethernet Universal LANCard	Xinetron Inc. Xinetron XiNet 4-in-One Super Ethernet Card
\$199	\$945	\$295	\$195	\$199	\$479	\$299	\$119
Client/server	Server	Client	Client	Client	Client	Client/server	Client
ISA	EISA	ISA	ISA	ISA	ISA	ISA	ISA
16	32	16	16	16	16	8/16	8/16
5 years	5 years	1 year	1 year	Lifetime	Lifetime	Lifetime	3 years

AUI, RJ-45	AUI, RJ-45	AUI, BNC, RJ-45	AUI, RJ-45	AUI, RJ-45	RJ-45	AUI, BNC, RJ-45	AUI, BNC, RJ-45
Hardware, software	Software	Software	Hardware	Software	Hardware, software	Hardware	Hardware
16K	128K	16K	16K	4K	64K	16K	16K
Optional	☐	Optional	Optional	Optional	Optional	Optional	☒
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ENDS

Ethernet Adapters

IMC Networks Corp.

IMC EtherNic/2000 Combo

BY STEVEN C.M. CHEN

The IMC EtherNic/2000 Combo lets you use existing wiring to install an Ethernet LAN. If you can't justify the cost of wire replacement, the IMC's versatility with wiring could be the answer.

The \$240 ISA client adapter is an Eagle NE2000-compatible solution for any office already wired with several cable types. In addition to standard 50-ohm thin coaxial cable, the IMC lets you use 93-ohm (ARCnet and IBM 3270) and 75-ohm (PCnet, G/Net, and Wang) cabling. All you need is IMC Networks Corp.'s inexpensive Cabling Option Resistor Kit, which is used for 93- and 75-ohm cabling.

The card's performance is not a strong point, however. On our tests, the card's throughput ranged from 13 to 29 percent slower than that of the Eagle NE2000T, near the bottom of the pack.

You use jumpers to configure the hardware. We also had to download a new ODI driver from the IMC BBS, because the original failed to work. IMC does provide a clear manual and a five-year warranty with its product.

The IMC EtherNic/2000 Combo lets you use existing wiring, but the tradeoff is slower throughput. Also, be prepared for limited hardware selection and possibly higher costs down the road.

• IMC EtherNic/2000 Combo

IMC Networks Corp., 16931 Millikan Ave., Irvine, CA 92714; 800-624-1070, 714-724-1070; fax, 714-724-1020.

List price: \$240; package of six, \$1,400.

Circle 551 on reader service card

Intel Corp.

Intel EtherExpress 16 TP LAN Adapter

Intel EtherExpress 32 LAN Adapter

BY STEVEN C.M. CHEN

The best combination of speed and CPU utilization in a server card comes from Intel Corp. The Intel EtherExpress 32 LAN Adapter, a \$795 EISA bus-mastering, software-configurable Eagle NE3200 clone, provides superior performance for multisegment networks. Intel also makes

a good ISA client card, the \$179 Intel EtherExpress 16 TP LAN Adapter.

Although slower than the leaders on our one- and two-segment clockings, the EtherExpress 32 took the lead on the three- and four-segment versions of our test. The card's performance boost can be credited to its bus mastering, a very efficient driver, and 48K of static RAM, which Intel claims is faster than the dynamic RAM used by most adapters. The EtherExpress 32 had the lowest CPU utilization with one segment, 64-byte packets and with two segments, 1K packets.

The EtherExpress 16 produced average throughput, slightly slower than Ea-

*The best combination
of speed and CPU
utilization comes from the
Intel EtherExpress LAN
Adapter.*

gle's NE2000T with smaller packets and faster with 512-byte and 1K data packets.

Each adapter has a three-year warranty. If you're planning a multisegment network, the EtherExpress 32 should be at the top of your list. The EtherExpress 16 is suitable for LANs that have moderate traffic.

• Intel EtherExpress 16 TP LAN Adapter, Intel EtherExpress 32 LAN Adapter

Intel Corp., 2200 Mission College Blvd., P.O. Box 58119, Santa Clara, CA 95052; 800-538-3373, 503-629-7000; faxback, 800-525-3019.

List price: EtherExpress 16 TP LAN Adapter, \$179; package of five, \$849. EtherExpress 32 LAN Adapter, \$795.

Circle 537 on reader service card

Invisible Software Inc.

Invisible Ethernet 2000TP

Invisible Ethernet 3200

BY TONY POMPILI

Neither price nor performance distinguishes Invisible Software's client and server adapters, the \$299 Invisible Ether-

net 2000TP and the \$599 Invisible Ethernet 3200.

Like other client adapters, the 2000TP comes with 16K of on-board RAM for buffering and offers AUI and RJ-45 network interfaces. The card installs quickly using the standard Eagle NE2000 ODI or NDIS driver. You set the I/O address and interrupts through software. Not surprisingly, the performance of the 2000TP mirrors that of the Eagle NE2000. It is more expensive than other NE2000 compatibles, however.

Invisible Software's server adapter, the new EISA-based Invisible Ethernet 3200, is difficult to install, and we had to adjust the minimum packet receive buffers parameter. The 32-bit card comes with 32K of RAM; AUI, BNC, and RJ-45 network interfaces; and LEDs that indicate when a packet is transmitted or received, and when the device is linked to the network.

Once installed, the card performed poorly on our tests. It used a high percentage of CPU overhead when handling multiple segments. Documentation for both cards includes topology overviews.

For a few more dollars than some of its 16-bit counterparts, the 2000TP client will give you average performance and easy installation. As a server adapter, however, the 3200 is inadequate for multisegment networks.

• Invisible Ethernet 2000TP, Invisible Ethernet 3200

Invisible Software Inc., 1142 Chess Dr., Foster City, CA 94404; 800-982-2962, 415-570-5967; fax, 415-570-6017.

List price: Invisible Ethernet 2000TP, \$299; Invisible Ethernet 3200, \$599.

Circle 552 on reader service card

Kodiak Technology Inc.

Kodiak 16 10BT

BY STEVEN C.M. CHEN

Kodiak Technology offers a free bonus to customers who purchase its adapter: a network diagnostic program.

The Kodiak 16 10BT itself is not too speedy. The \$179 ISA client adapter had one of the lowest throughputs of the cards we tested, 12 to 30 percent lower than that of the Eagle NE2000T, making it most appropriate for small, low-volume networks. It produced erratic throughput

NETWORKING

Ethernet Adapters

The Lannet LEC-145T/AT and 45T/AT offer a little better performance at sending large packets than does the industry-standard Eagle NE2000.

readings rather than the smooth and consistent throughput of other adapters, however. Kodiak had not yet optimized the drivers for fewer than six segments.

The Kodiak 16 10BT comes with plenty of drivers, and installation is trouble-free. You can configure the hardware settings, such as the boot ROM, via jumpers. The diagnostic software not only checks the adapter's status, it also detects other network nodes and displays basic network statistics during installation.

Kodiak also gives you toll-free techni-

cal support and a five-year warranty. With so many good Ethernet adapters on the market, though, you would be wise to choose this one only if you have a small, low-volume network, where throughput is not critical.

• Kodiak 16 10BT

Kodiak Technology Inc., 47131 Bayside Pkwy., Fremont, CA 94538; 800-888-8084, 510-226-7840; fax, 510-770-9042. List price: \$179; package of five, \$895.

Circle 538 on reader service card

Lannet Data Communications

Lannet LEC-415T/AT

Lannet LEC-45T/AT

BY TONY POMPILI

The LEC-415T/AT and LEC-45T/AT from Lannet Communications are flexible, well-documented, easy-to-install Ethernet adapters for those looking for a little better large-packet performance than the industry-standard NE2000. Zenith Data Communications is the origi-

nal-equipment manufacturer.

The \$299 LEC-415T/AT and \$269 LEC-45T/AT are more expensive than many client adapters we tested. Both 16-bit ISA cards come with 8K of RAM and offer AUI and RJ-45 connections; the LEC-415T/AT also offers BNC.

You can configure the cards through software and jumpers, storing interrupts and I/O addresses in EPROM. Both use Lannet's EZSETUP program for software configuration and diagnostics. The manual, still bearing the marks of the manufacturer, Zenith, covers basic hardware installation and troubleshooting, as well as automatic detection and correction of wiring polarity problems.

If you need a little more throughput than the NE2000 provides, these adapters might just fill the bill.

• Lannet LEC-415T/AT, LEC-45T/AT
Lannet Data Communications, 7711 Center Ave., #600, Huntington Beach, CA 92647; 800-526-6388; 714-891-5580.

List price: LEC-415T/AT, \$299; LEC-45T/AT, \$269.

Circle 546 on reader service card

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ISBN: 1-56276-094-7
Price: \$22.95

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ARE YOU NUTS?

More about it this page when the nut will be in a place in the book. Today it is on page 116.

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Longshine Microsystems Inc.

Longshine ShineNet LCS8634T

Longshine ShineNet LCS8734

BY TONY POMPILI

LAN administrators looking for good performance and a great price will find that Longshine Microsystems' \$159 ShineNet LCS8634T fills the bill. But the company's new 32-bit EISA board, the \$469 ShineNet LCS8734, does not duplicate the other entry's strong showing.

The company's 16-bit ISA client adapter, the Longshine ShineNet LCS8634T, is hardware configurable; Longshine's clear documentation illustrates the board's default settings. The board comes with its own ODI driver and offers AUI and RJ-45 connections, but lacks LEDs for board or network status. It turns in about average throughput, not bad considering its price.

The ShineNet LCS8734 is a different story. It proved difficult to install and all of the adapters had to be set to the same interrupt, which is somewhat unintuitive. The LCS8734 performed reliably only when connecting the server to a single segment. With multiple adapters installed, it produced unsteady throughput and excessive collisions. Unlike other cards, which increased server utilization as we installed more cards, the LCS8734 demonstrated abnormally low CPU utilization when a third and fourth LCS8734 card were added to the server. Longshine could not explain the fluctuations.

The ShineNet LCS8634T is a real steal, but hold off from marrying into the whole family. The ShineNet LCS8734 is fine for single-segment LANs only.

• Longshine ShineNet LCS8634T, Longshine ShineNet LCS8734

Longshine Microsystems Inc., 10400-9 Pioneer Blvd., Santa Fe Springs, CA 90670; 310-903-0899; fax, 310-944-2201.

List price: ShineNet LCS8634T, \$159; ShineNet LCS8734, \$469.

Circle 547 on reader service card

Network Interface Corp.

NIC 10320

BY TONY POMPILI

The distinguishing characteristic of Network Interface Corp.'s 10320 is its easy configurability. The \$209 NE2000-compatible is a bare-bones package that combines adequate pricing with better-than-average performance. The 10320 is a 16-bit ISA Ethernet client adapter with 16K of on-board RAM. It's mostly suitable for small-business networks.

DIP switches for setting interrupts and I/O addresses are mounted on and near the top of the card, making it easy to change switches.

The 10320 fared well on our Network Throughput test, with better-than-average throughput on three of the four versions.

On the 256-byte version, the 10320 pumped packets at 2.48 megabits per second, compared to the NE2000T's 2.38.

Documentation is sparse. The board comes with a four-page leaflet to help define I/O and interrupt-switch settings. Beyond that, you're on your own. On the plus side, you get a five-year warranty.

For the experienced user, the NIC 10320 is a fair choice, offering good performance at a reasonable price.

• NIC 10320

Network Interface Corp., 15019 West 95th St., Lenexa, KS 66215; 800-653-2853, 913-894-2277; fax, 913-894-0226.

List price: \$209; package of six, \$1,160.

Circle 548 on reader service card

NetWorth Inc.

NetWorth EtherNext UTP16-A

BY TONY POMPILI

NetWorth's EtherNext UTP16-A is an average NE2000 alternative with a little better performance and a touch higher price tag than many boards we tested.

This \$249 16-bit ISA client board includes AUI and RJ-45 connectors and

uses the NE2000 ODI driver for NetWare. The card comes with 16K of RAM and six LEDs to report on reception, transmission, and link conditions, polarity problems, and whether or not you are running AUI (thick Ethernet). The LEDs are on the inside of the card, making them difficult to monitor..

The EtherNext edged out the industry-standard NE2000T slightly on the 256- and 512-byte versions of the throughput test. The card dropped into its slot and ran without a fuss. NetWorth's well-illustrated documentation simplifies setting hardware jumpers for the interrupt and base addresses. The card comes with a three-year warranty. Although a little higher in price than the average card we tested, it's an acceptable buy for anyone needing a little extra performance in small networks that don't require many cards.

• NetWorth EtherNext UTP16-A
NetWorth Inc., 8404 Esters Blvd., Irving, TX 75063; 800-544-5255, 214-929-1700.

List price: \$249; package of five, \$995.

Circle 549 on reader service card

Pure Data Inc.

Pure Data PDI8023-16T

BY TONY POMPILI

Pure Data's PDI8023-16T Ethernet adapter counters slightly below-average performance and limited network interface options with easy installation plus diagnostic tools for those less experienced with network adapters.

The \$229 16-bit ISA client card contains 16K of on-board RAM buffering. It comes with only an RJ-45 connector for twisted-pair cabling. Pure Data sells other cards with AUI, BNC, and RJ-45 connectors, however. The PDI8023-16T uses the extra space for four external LEDs, more than most cards, to display transmission, reception, collision, and link status.

The PDI8023-16T ran a little slower than the NE2000T in our client tests. Although the card worked right out of the box, Pure Data includes configuration software for setting jumpers. The documentation is among the best, with clear installation instructions and a concise glossary of LAN terms.

The PDI8023-16T may not be the fas-

Ethernet Adapters

test card for the price, but it's a good value, especially for first-time LAN card users on twisted-pair networks.

• Pure Data PDI8023-16T

Pure Data Inc., 1740 S. I-35, Carrollton, TX 75006; 800-661-8210.

List price: \$229; package of six, \$1,199.

Circle 550 on reader service card

Racal-Datacom Inc.

Racal ES3210

Racal InterLAN AT 3M

Racal NI6510-10BT

BY STEVEN C.M. CHEN

Bus-mastering client adapters deliver server data in a flash. Racal-Datacom has a bus-mastering adapter that won't break your bank account, along with versatile but slow client and server adapters.

The \$239 NI6510-10BT, an 16-bit ISA adapter, finished in second place among client adapters in three out of four Network Throughput tests. The \$279 ISA-based InterLAN AT 3M did not do as well, but can connect to nearly any type of Ethernet network. The \$749 ES3210 is a below-average EISA server adapter that provides AUI and BNC connectors.

As a server adapter, the NI6510-10BT's scores were poor. The InterLAN AT 3M handles large packets efficiently, but its throughput ranged from 3- to 20-percent slower than an NE2000. Racal claims that an incompatibility with the testing PC may have caused the adapter to run in 8-bit mode only. Racal sent us newer drivers, which they now offer on their BBS; network throughput increased by 8- to 10-percent. The ES3210 has the lowest performance index among the EISA server adapters we tested.

All the adapter are backed by a lifetime warranty. If your busy network demands high-performance client adapters, the NI6510-10BT fills the bill. But don't expect the same performance from the other two Racal adapters.

• Racal ES3210, Racal InterLAN AT 3M, Racal NI6510-10BT

Racal-Datacom Inc., 155 Swanson Rd., Boxborough, MA 01719; 800-526-8255, 508-263-9929; fax, 508-263-8655.

List price: ES3210, \$749; InterLAN AT 3M, \$279 (package of five, \$1,399);

NI6510-10BT, \$239 (package of five, \$1,139).

Circle 539 on reader service card

SIIG Inc.

SIIG E-LAN200T

BY TONY POMPILI

Buying Ethernet cards that closely mimic the industry standard can win you points for getting reliable, if unexciting, products. Using generic NE2000 ODI drivers, the SIIG E-LAN200T's performance and price are on par with Eagle's Ethernet-standard adapter.

The \$249 E-LAN200T is a 16-bit ISA adapter with 16K of on-board RAM. Four LEDs (invisible unless the computer case is open) report on packet transmission or reception, collisions, and when a defective card sends out data without checking for an open channel. The E-LAN200T offers only AUI and RJ-45 connectors, so it's inappropriate for thin-wire coax networks.

Tested as a client adapter, the E-LAN200T offers slightly better throughput than the NE2000T. The 24-page manual gives solid configuration and installation instructions but falls short of offering help with NetWare driver installation. There are no diagnostics and no additional drivers. You use hardware jumpers to configure interrupts and I/O addresses. The E-LAN200T is a safe choice for those looking to stay close to the NE2000 standard.

• SIIG E-LAN200T

SIIG Inc., 6078 Stewart Ave., Fremont, CA 94538; 510-657-8688.

List price: \$249.

Circle 540 on reader service card

Standard Micro Systems Corp.

SMC EtherCard Plus Elite 32T

SMC EtherCard Plus Elite 16T

BY TONY POMPILI

Standard Micro Systems brings a distinctive twist to Ethernet server adapters with its dual-port SMC EtherCard Plus Elite 32T. The company's client adapter, the SMC EtherCard Plus Elite 16T, lives up to the company's reputation for respectable performance at a fair price.

The \$945 Elite 32T is a 32-bit EISA card that contains dual Ethernet controllers, buffers, LED arrays, and RJ-45 connectors for connecting to two Ethernet networks.

The \$199, 16-bit Elite 16T offers AUI and RJ-45 interfaces; four internal LEDs report on transmissions and receptions, polarity, and link status. The Elite 16T comes with SMC's own ODI driver.

In comparison to other 32-bit cards we tested, the Elite 32T had low performance indexes. With two cards installed, the Elite 32T reached 94 percent CPU utilization, even though it employs bus-mastering. That's because the CPU still sees the workload on this dual-port adapter as four segments, not two.

The Elite 32T provides its own server driver and installs without a hitch. Its documentation is easy to follow, with clear explanations of how to install the card in various LAN topologies. The Elite 16T and 32T are software configurable, and the documentation takes pains to resolve possible interrupt conflicts and explain SMC's diagnostic program.

The Elite 16T is a good fit for anyone who is uncomfortable installing a LAN card. Its performance falls in the mainstream of the products we reviewed. The Elite 32T's dual set of features make it a good fit in servers where space is tight. But the device is comparatively slow and has a high price tag.

• SMC EtherCard Plus Elite 32T, SMC EtherCard Plus Elite 16T

Standard Microsystems Corp., 80 Arkay Dr., Hauppauge, NY 11788; 800-762-4968, 516-435-6255; fax, 516-273-1803.

List price: Elite 16T, \$199; \$995, package of six. Elite 32T, \$945.

Circle 541 on reader service card

Sureman Computer Corp.

Sureman EtherPerfect EP-301

Sureman NE-2T

BY TONY POMPILI

Sureman Computer Corp.'s EtherPerfect EP-301 and NE-2T Ethernet adapters offer industry-standard performance with no-fuss setup and installation. The less expensive NE-2T offers slightly better throughput than its sibling.

The \$295 EtherPerfect EP-301 is an

Ethernet Adapters

ISA-bus card that includes AUI, BNC, and RJ-45 connectors, as well as LEDs displaying transmit/receive, link, and polarity information. Sureman claims the EtherPerfect EP-301 jumpers can be configured in EPROM through software, but the board failed to deliver on that promise when we tested it. This software-configuration feature should be working by the time you read this.

We were also unable to make the adapter work with the supplied ODI driver and tested the card with standard NE2000 drivers. The EP-301's scores were about average. The older NE-2T, with hardware-only jumper settings, offered slightly better throughput and provides the same network interface options and 16K of on-board RAM. Future versions of the EP-301, with their easier software configuration, may have an edge on the older NE-2T product. But for now, the \$195 NE-2T still has the lead in performance and low price.

• Sureman EtherPerfect EP-301, Sureman NE-2T

Sureman Computer Corp., 15338 E. Valley Blvd., City of Industry, CA 91746; 818-333-7730; fax, 818-333-1803.

List price: EP-301, \$295; NE-2T, \$195.

Circle 542 on reader service card

3Com Corp.

3Com EtherLink 16 TP

3Com EtherLink III

BY STEVEN C.M. CHEN

3Com advertises speedy adapters, and speed is exactly what the EtherLink III delivers. The 3Com device had the highest scores among client adapters on all four versions of our throughput test.

The \$199 ISA EtherLink III boasts 3Com's newest architecture, Parallel Tasking, which can process a packet before it's completely received into adapter memory. The adapter, as well as its drivers, are self-tuning for maximum throughput. We were unable to test the EtherLink III as a server adapter because a NetWare server driver wasn't available at the time. The company says this driver will be available sometime in the future.

The EtherLink 16 TP, a \$479 ISA adapter, showed below-average throughput in every client test. 3Com said that

the defaults needed to be changed from 8 bit to 16 bit, but we found no difference in performance when we did so.

One of the reasons for the high price of the EtherLink 16 TP is that it is designed to work with hardware that existed before 10BaseT became a standard. If you are not running 10Base10, you'll need to set some jumper switches.

The documentation for both products is clear and extensive. The EtherLink III will automatically configure itself and check for conflicts. Support for SNMP MIB (Simple Network Management Protocol management information base) II is built into the drivers of both adapters. MIB II is also built into the EtherLink III hardware, where it's able to collect statistics without adversely affecting adapter performance.

Backed by 3Com's reputation, a lifetime warranty, modest pricing, self-tuning, built-in SNMP support, and the fastest throughput of any client adapter, the EtherLink III is suitable for just about any networking environment. For working with pre-10BaseT standards, the EtherLink 16 TP is the choice.

• 3Com EtherLink 16 TP, 3Com EtherLink III

3Com Corp., 5400 Bayfront Plaza, Box 58145, Santa Clara, CA 95052; 800-638-3266, 408-764-5000; fax, 408-764-5032.

List price: EtherLink 16 TP, \$479; \$2,195 package of five. EtherLink III, \$199; \$910, package of five).

Circle 543 on reader service card

Tiara Computer Systems Inc.

Tiara Ethernet Universal LANCard

BY TONY POMPILI

Tiara Computer Systems' Tiara Ethernet Universal LANCard, a 16-bit ISA adapter, performed well as a client adapter and kept up with the 16-bit server adapters as well. Priced at \$299, it offers users of small, single-segment LANs a low-overhead server-adapter choice.

The Universal LANCard offers AUI, BNC, and RJ-45 interfaces. The adapter can be up and running in minutes using the client's version of the NE2000 ODI driver software. LEDs report transmissions, receptions, and collisions.

The card has 16K of on-board RAM and had the best performance index

among 16-bit server cards on the one-segment, 64-byte and 512-byte versions of our test. As with other 16-bit cards we tested in servers, the Tiara adapter overworked the server when we added a second segment. In the client, the Universal LANCard's throughput was slightly less than that of the NE2000T.

The Tiara card has a comprehensive manual documenting hardware setup and describing basic LAN topologies. A diagnostic program also comes with the card.

For server and client PCs, the Tiara Ethernet Universal LANCard is a solid performer at a fair price.

• Tiara Ethernet Universal LANCard
Tiara Computer Systems Inc., 1091 Shoreline Blvd., Mountain View, CA 94043; 800-638-4272, 415-965-1700.

List price: \$299; package of six, \$1,770; package of 20, \$5,700.

Circle 544 on reader service card

Xinetron Inc.

Xinetron XiNet 4-in-One Super Ethernet Card

BY TONY POMPILI

Xinetron's XiNet 4-in-One Super Ethernet Card is a low-cost alternative to the Eagle NE2000 that offers a quick and easy network connection.

Priced at \$119, the card is one of the least expensive Ethernet adapters we tested. The 16-bit ISA adapter comes with AUI, BNC, and RJ-45 interfaces and 16K of on-board RAM. The board uses standard NE2000 drivers. The remote-boot chip, usually an option on competitors' cards, comes with Xinetron's. External LEDs display receive, transmit, link, and collision information.

The XiNet is slightly slower than the average 16-bit Ethernet adapter and the industry-standard NE2000T card. You configure the card's I/O and interrupts with hardware jumpers. The card plops into place and is operating in minutes. The Xinet is worth considering, especially if you're watching the bottom line.

• XiNet 4-in-One Super Ethernet Card
Xinetron Inc., 2302 Walsh Ave., Santa Clara, CA 95051; 800-345-4415, 408-727-5509.

List price: \$119; package of six, \$696.

Circle 545 on reader service card □



100 Survival Of The Fittest

When it comes to memory upgrades, others might not consider Kingston's precise manufacturing methods completely natural. Nor, for that matter, our rigorous testing procedures. But then Kingston memory modules do have 4,982,131 reliable ancestors to live up to.



Kingston
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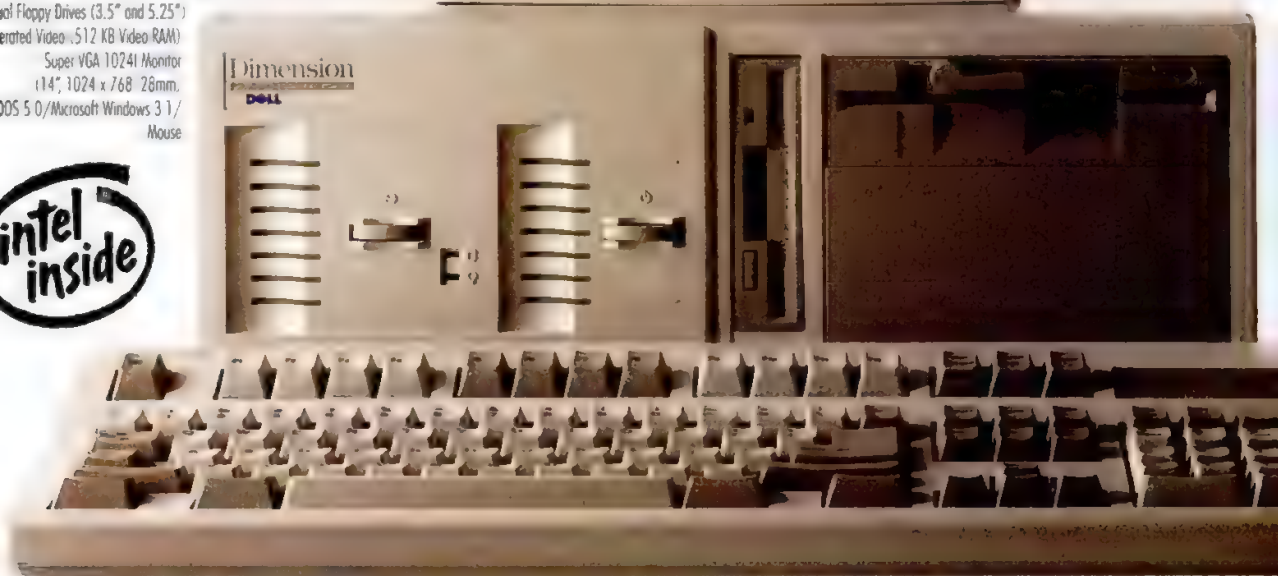
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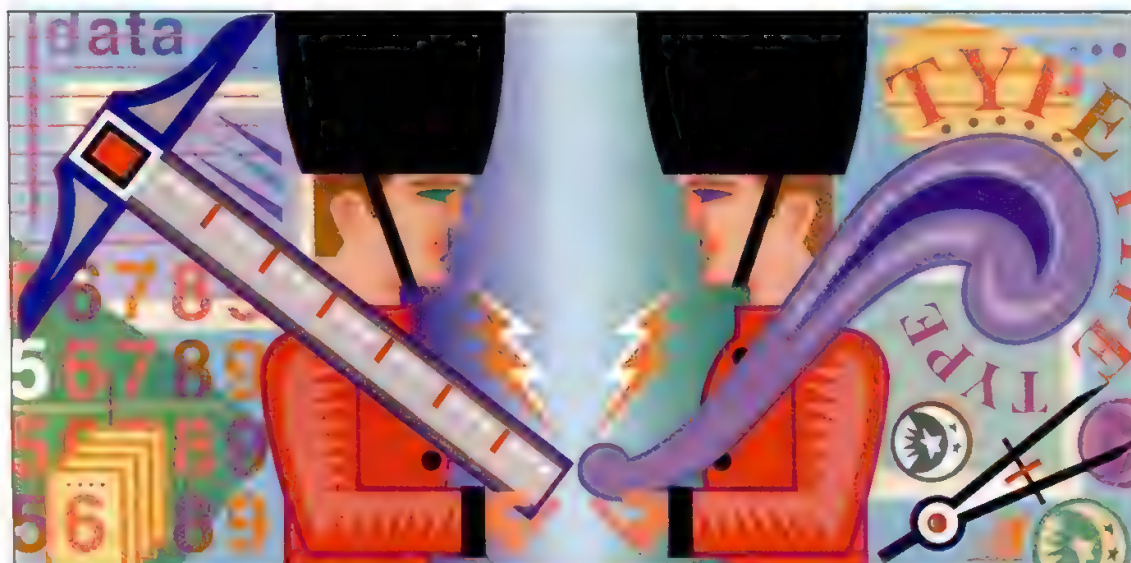
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HIGH-END DTP

The Changing Of the Guard?



Desktop publishing programs have reached a fork in the road. One path leads to design-driven documents, the way mapped out by tools that inspire artistic expression. The other path leads to content-driven publications, where data manipulation and document manage-

A rule of thumb once advised that you bought PageMaker for design-intensive DTP and Ventura for long documents. Now, QuarkXPress and FrameMaker have changed the rules.

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by Luisa Simone

GRAPHICS

High-End DTP

Suitability to Task: High-End Desktop Publishing Software

The variety of documents you can produce with today's high-end DTP software is limited only by your imagination, but any use you have in mind will probably fall into one of our four Suitability to Task categories. The old DTP favorites—Aldus PageMaker and Ventura Publisher—tend to be solid rather than stellar performers across a broad range of document types, while FrameMaker and QuarkXPress are masters at very specific types of applications.

To evaluate each product's facility at a range of tasks, our reviewers created two documents. The first was a four-page newsletter created using a variety of imported text files, imported graphics, and both Adobe Type 1 and TrueType fonts. The front page of the newsletter included white text overprinted on a TIFF bitmap, an EPS logo, and force-justified reverse text on a background of 30 percent gray tint. The inner two pages formed a spread that contained a footer, a gray-scale TIFF bitmap cropped to an ellipse, contrast-adjusted, and placed behind a text callout; an imported and rotated three-color HPGL file; mixed two- and three-column layouts on each page; a byline inset into the text; a formatted table; a title rotated to an odd angle; and a sidebar with a custom tinted background. We jumped the stories onto the last page of the newsletter, with "continues" and "continued from" tag lines to indicate the jump. The last page also contained text wrapped around an irregularly shaped piece of clip art in CGM format and an article with a drop cap three lines deep. Various elements of the newsletter were tinted with custom-created spot and process colors. We printed the publication to both an HP LaserJet III and a Tektronix Phaser II (a color PostScript printer).

For our second document, we created paragraph styles and imported a 100-page tagged-text file. We then inserted tables, equations (for those packages that include an equation editor), a running header and footer (containing subheads picked up from within the document text as well as page numbers), and footnotes, some of which jumped to a second page. Finally, we generated a table of contents and a two-level index, which used page-numbering schemes different from the rest of the document, and we printed the document on the LaserJet III.

In the course of creating the two publications,

SUITABILITY TO TASK				
Product Name	POOR	FAIR	GOOD	EXCELLENT
Highly designed publications	☒	☐	☐	☐
Long documents	☒	☒	☐	☐
Electronic publishing	☒	☒	☒	☐
Workgroup publishing	☒	☒	☒	☒
Workgroup publishing	N/A			

N/A—Not applicable: The product does not perform this task.

we also tested workgroup capabilities such as file sharing and link tracking on a NetWare network, and electronic distribution functions.

To excel at creating **highly designed publications**, a product must have sophisticated typographic controls (such as automatic drop caps, precision leading, kerning, and tracking capabilities, and robust font handling), handle a myriad of graphics formats without problems, be able to mix custom spot and process colors, offer robust tools for generating complex page layouts, and accurately output attractive pages.

In addition to handling large amounts of text, a product that is superior for creating **long documents** should offer sophisticated continuity controls. These include complex page numbering schemes, intelligent figure placement, and cross referencing, as well as flexible running headers and footers. The package should also be capable of automatically generating a multiple-level index and a table of contents, as well as footnotes and endnotes.

Capabilities central to **electronic publishing** and distribution include flexible control over display—for instance, intelligent font-mapping solutions or the ability to construct pages with display-based aspect ratios—as well as some level of intelligent interactivity. The program should be able to create small files for efficient distribution, and the vendor should supply a convenient method for distributing documents and provide robust error-handling methods to deal with cross-operating system incompatibilities.

A product useful for **workgroup publishing** must have robust network support and, at the very least, allow multiple users to share templates. Having versions of the product that run on a variety of platforms is a definite plus. Optimally, the product should offer linked-file tracking and management, redlining, and update tracking.

ment functions determine the form of the final product. But in this scenario it is users, not developers, who are the pathfinders. Their needs and real-world challenges make this either-or not only necessary but desirable. And where users go, developers are sure to follow.

Of course there is common ground among high-end DTP programs. In fact, the five packages we look at here—Aldus PageMaker; FrameMaker 3.0 for Windows; QuarkXPress for Windows, Ventura Publisher 4.1 for Windows; and Ventura Publisher, OS/2 Edition—all met the same requirements to qualify for review in this story. They all cost less than \$1,000 and can produce documents of at least 100 pages in length. Their sophisticated typographic controls include support of Adobe Type 1 fonts, paragraph-level named styles or tags, and the ability to specify type and leading in fractional point increments. Each program's layout capabilities include text flow to discontiguous pages and import filters for color images in EPS and TIFF formats. Finally, all of these programs offer cross-compatibility with the Macintosh.

There are other high-end publishing products that failed to meet all of these selection criteria. Interleaf 5 for DOS exceeded our price cutoff of \$1,000. Interleaf's pricing structure, which is aggressive for multiuser installations, offers economies of scale to large companies. But the basic 5-person workgroup package costs \$8,000 or \$1,600 per station. Interleaf is where you go when Ventura Publisher and FrameMaker seem too underpowered for your needs.

DECwrite Pro from Digital Equipment Corp. was eliminated from this review because, though Digital offers a Unix version, DECwrite does not run on Macs. Cross-platform compatibility with the Mac is no longer an oddity or a luxury; it is a necessity if you want to achieve high-quality output at the many Mac-centric service bureaus.

Though all five products met the selection criteria, they nevertheless travel divergent paths. It's fair to say that PageMaker and QuarkXPress are intended more for design-driven documents. They both allow an art director to fiddle, tweak, and finesse a design by providing easy access to typographic and picture controls. Both programs also of-



EDITORS' CHOICE

fer the most artsy features, including the ability to create and edit irregular text wraps and to colorize imported gray-scale images.

In contrast, Ventura Publisher and FrameMaker are designed for content-driven documents. These programs stress continuity controls, such as automatic numbering schemes for chapters, captions, tables, and even individual paragraphs. Anchoring a graphic to text, generating a table of contents, and creating an index are essential tools for long documents. And because they expect their users to massage complex data, both Ventura Publisher and FrameMaker have table and equation editors.

THE DTP CONTINUUM

Generalizations aside, these products do not divide neatly into two opposing camps; examining each program's feature set reveals instead that the programs are spaced out rather evenly along a continuum of functionality. PageMaker and Ventura previously defined the extremes of high-end DTP programs; now they define the middle. Ultimately, that's good news for buyers: No matter what the application, you can find a powerful desktop publishing program with the right feature mix.

At one end, QuarkXPress offers truly creative tools such as free rotation of text and graphics and gradient fills. Moving toward the center, we see that PageMaker supplements its heavy-duty design functions with a few key document-management features, such as book creation and table of contents generation.

In addition to its long-document expertise, Ventura Publisher contains robust design tools: Automatic drop caps and automatic bulleted lists are just two of many. Finally, FrameMaker pushes the envelope of document management with features like conditional text (read the sidebar "Customize Documents with Conditional Text") and the ability to search for unresolved cross references.

The products reviewed here are all capable—even elegant—desktop publishing programs. They can all create a

- **FrameMaker 3.0 for Windows**
- **QuarkXPress for Windows, Version 3.1**

PC-based desktop publishing has always been a two-party system: long documents versus design-intensive ones. The names have changed but the parties remain the same. The reigning leader for long documents, Ventura Publisher, has lost its seat

to FrameMaker 3.0 for Windows. FrameMaker's conditional text lets you turn any magnum opus into a series of customized opera. Combined with a powerful equation editor, advanced table-of-contents and index-generation capabilities, and support for on-line viewing and distribution, FrameMaker brings next-generation document publishing to the PC.

Similarly, QuarkXPress for Windows supplants last decade's ruler, Aldus PageMaker, for the creation of design-intensive publications. QuarkXPress provides unprecedented control over typography, the placement of elements, and pre-press functions—all via one of the most intelligently designed interfaces we've seen this year.

But just because they've been unseated doesn't necessarily mean that PageMaker and Ventura are out of the

running. Quark's decision to sacrifice quality support for low-cost output devices leaves PageMaker as the best high-end DTP product for the millions of users who rely on PCL-compatible and ink jet printers. It also remains the strongest all-around product for users who need to create a broad spectrum of document types.

By the same token, FrameMaker's lack of color support puts Ventura Publisher for Windows in a strong position for long-document creation. Users who feel that complex content deserves a colorful treatment will find Ventura's excellent internal and add-on color capabilities more than enough reason to buy the product. If you're running OS/2, you're probably better off running the Windows version of Ventura Publisher than the older, less feature-rich OS/2 Edition.

wide variety of documents. So to help you with your decision making we would like to suggest a new approach: Don't simply consider what you want to publish, consider *how* you want to publish it.

WORKGROUP PUBLISHING

If you want to produce publications in a workgroup environment, you will need a program with special features. These days, simple file locking is a routine function handled by your network operating system and your operating environment. So for producing publications in a workgroup environment, look for a program that also warns you that a publication is

in use, but still allows you to open either a working copy or a read-only version. Similarly, you will want shareable templates. After all, what is the value of a template residing on the network if multiple users can't open individual copies?

Though it may not seem like a network-related issue, cross-platform binary compatibility at the publication level is essential. Consider a network installation that includes PCs, Macs, and Unix workstations. With binary-compatible file formats, you can open a file from any node on the network, regardless of the hardware platform. Keep in mind, however, that many variables play a part in compatibility and that moving from platform to platform may require compromises.

Finally, a desktop publishing program must be equipped with extensive file-linking and file-tracking functions. These

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High-End DTP

will allow you to manage the various elements in a publication as well as multiple contributions via the network. It isn't sufficient for a publishing program to track only imported pictures, because most DTP documents are text-intensive. So look for a program that can link and track external text files, too. The DTP program should have the ability either to perform an automatic update or to alert you if the external source file has been modified.

THE INTERLEAF ALTERNATIVE

As you read the reviews and analyze the features table you'll discover that the current crop of DTP products have serious shortcomings where workgroup publishing is concerned. The program on the market with the greatest number of workgroup features isn't reviewed here. Interleaf 5 for DOS (800-955-5323) deserves your attention if you are considering an enterprise-wide publishing venture. With Interleaf, two users on a network can share the same electronic desktop and work on pieces of the same document simultaneously. The Interleaf UI (User Interface) can also be customized for specific users (based on the user's network sign-on). For example, an executive profile might load a version of Interleaf with limited functionality. The executive would be able to read and annotate—but not modify—a document.

Though it comes at an additional cost of several thousand dollars, Interleaf 5 offers a revision tracking system. This utility keeps a running log of all the changes made to a document. In addition, an electronic trail lets users roll back through the various revisions to retrieve an earlier version of the publication.

Interleaf's migration to the DOS platform and the announced Microsoft Windows NT version of the product are both harbingers of things to come. In fact, as the Windows environment matures (with the release of 32-bit Windows NT and the more robust OLE 2.0 specification) other desktop publishing programs will begin to offer similar functions.

Conversely, OS/2 development for this market has slowed to a crawl. Only Ventura offers an OS/2 version of its product (Aldus has taken PageMaker for OS/2 off the market) and that—Ventura Publisher, OS/2 Edition—is comparable to a much earlier version of Ventura Publisher for Windows.

THE WATCHWORD IS EXTENSIBILITY

No electronic publishing program contains the perfect feature set—yet. However, it is increasingly possible to create a near-perfect DTP package by modifying the core program.

No DTP program yet contains the perfect feature set. But you create a near-perfect package by modifying the core program.

Today, GUI-based desktop publishing programs are extensible through the use of OLE (Object Linking and Embedding) links and DLL (dynamic link library) modules.

QuarkXtensions are certainly the best known example of add-on functionality. A firm schedule

was not available at press time, but by the beginning of 1993 a considerable number of QuarkXtensions will move from the Mac to the PC, including Xdata from Em Software (a database publishing extension), Sonar Bookends from Virginia Systems (which automatically generates a table of contents or index), and CopyFlow from North Atlantic Publishing Systems.

But Quark does not have a monopoly on the idea of program extensions. The next version of PageMaker will include Aldus Additions (which are already in PageMaker for the Mac), through which third-party manufacturers can enhance PageMaker's functionality. Aldus Additions differs from QuarkXtensions in a number of ways. Most notably it includes a macro language that allows end users to develop custom applications. And Ventura ColorPro, Ventura Separator, and Ventura Scan add terrific scanning and color separation functions to Ventura Publisher. In fact, Separator and Scan are bundled with the latest version of Ventura Publisher.

Most impressive is the recent announcement from Frame Technology: FrameBuilder is a new product best

described as a fully extensible version of FrameMaker. With FrameBuilder, which is currently available only on Unix systems, it will be possible to integrate publishing functions into other nonpublishing applications. For example, a corporation could create a custom application that looked and behaved like their standard database program but included FrameBuilder's document creation and management functions.

To give credit where credit is due, Interleaf has delivered this level of customization for years. The Interleaf Developers Toolkit requires programming expertise but can be used to add unique functions to the program, to customize the user interface, or to build completely new applications.

WHAT'S IN A NAME?

New catch phrases, such as "business-critical documents", or "enterprisewide publishing" attempt to evoke both the increased importance and broader scope of the publishing process. Whatever else it may be, high-end electronic publishing is not about 300-dpi laser-printed output. Professional art directors—almost by definition—work in a PostScript environment. In order to offer full functionality, such as 360-degree rotation and gradient fills, PostScript code is the only reasonable way to go. And PostScript printers offer advantages over PCL printers. For example, if your PostScript printer vendor supplies a PDF (printer description files are common on the Mac), QuarkXPress can access the information in order to generate optimal dot shapes and screen angles.

So in addition to considering how you will create your documents, you must consider how you will distribute them. If you intend to reproduce your publications via the offset printing process, make sure that the program you choose speaks the language of a professional pre-press shop or commercial printer. Your printer may want you to generate color-separated PostScript files. If you are going to generate the separations, you must distinguish between the different types of color separation offered by electronic publishing programs. The easiest and most common form of separations contain only spot colors. Of the programs in this roundup, only QuarkXPress gives



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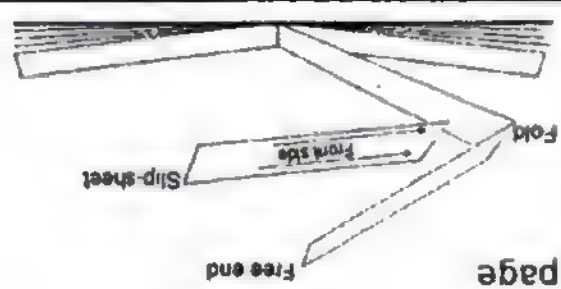
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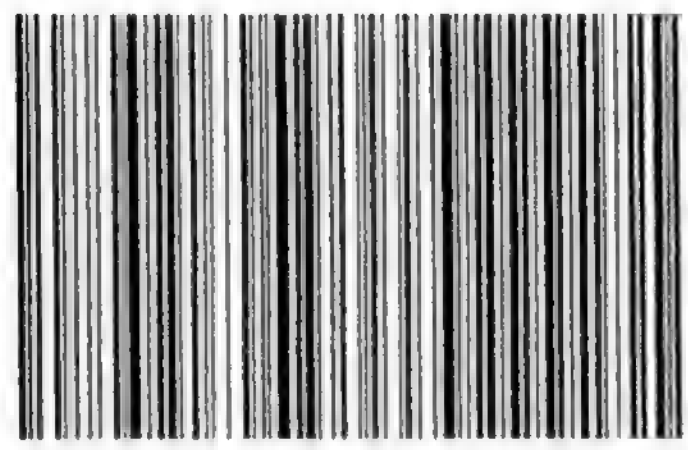
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1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

Inverted Foldout slip-sheet

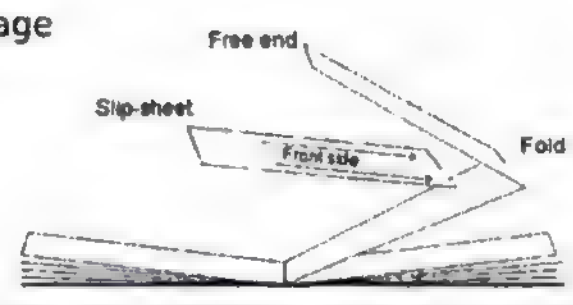


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Folded edge of the page

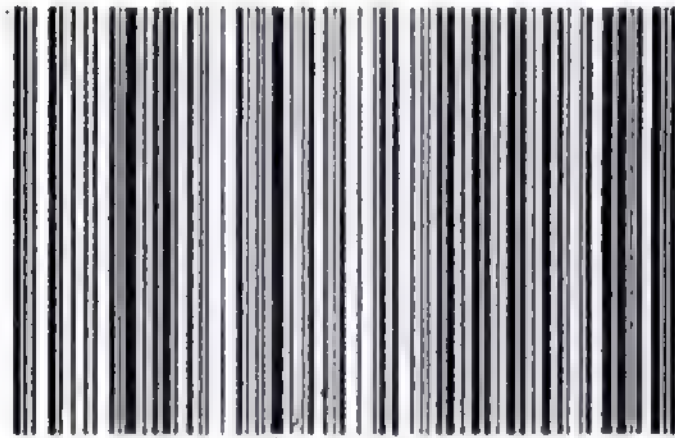
Foldout slip-sheet

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2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back

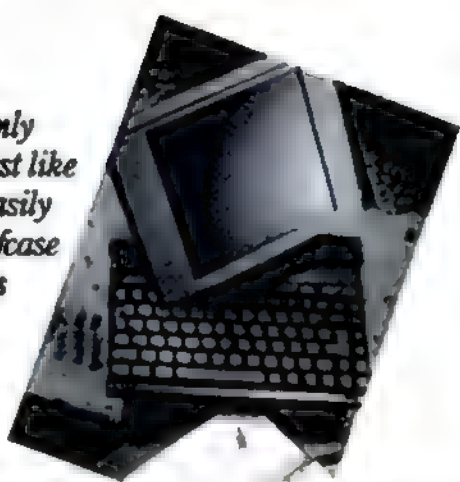


Gbs5lipBack-001B

Back

1. Follow instructions on the other side

Measuring only 8.5" x 11.3" just like a notepad. Easily fits into a briefcase at 5.6 pounds yet packs all the wallop of a desktop!



This fine Italian leather carrying case is an additional option. Loaded with pockets and features everyone will appreciate.



Digital brightness and contrast buttons make screen adjustment so easy.

ZEOS® Freestyle/SL. More features at a lower cost than any other notebook.

To try and compare the new ZEOS Freestyle/SL to any other notebook is next to impossible. Because nothing else has all its features. And even with all these great features, nobody can match the price. Features and price. It would seem the new ZEOS Freestyle/SL is the best of all worlds. It is.

DESIGNED BY USERS. JUST LIKE YOU!

We asked our customers what it is they want in the perfect notebook. The first thing they told us is that most notebooks look like a cigar box with a lid. They told us they wanted not only good looks, but things like great power *and* great battery life. Lightweight too, like five pounds and change. And the keyboard should be effortless to use. The entire product had to be extremely durable. And that was just for starters.

SL POWER. SL BATTERY LIFE. 64K CACHE!

We listened well. Then we got down to work. For the chipset and CPU we selected the Intel 25MHz SL. We then built in a high-speed 64K SRAM cache as standard. We know this system might well replace a desktop for many users.

And power to your ZEOS Freestyle/SL system is provided by our advanced battery system. The fully enclosed lightweight battery packs easily snap in and out and can be "quick-charged" when the system is not being used or trickle-charged when in use. So what happens when the power is on?

Period.

GREAT VIDEO TOO.

You get great video! Because for video control, we chose the amazing new Cirrus Logic VGA controller. It not only consumes less power, it also produces the fast crisp images you're looking for. And with a business machine like this you'll also appreciate our dual display capabilities. You can connect an external VGA color monitor for simultaneous display. And that's not all.

A NOTEBOOK KEYBOARD YOU'RE GOING TO LOVE.

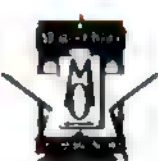
We re-designed and re-sculpted every key from scratch. Even the key-switch mechanism was invented anew. And we added the mouse key for easy cursor control. It is the absolute perfect notebook keyboard. What else?

Lots else! Like the best display system of any notebook available anywhere. We listened here too. The screen is big and easy to read. Plus, it's high contrast and it's fast. It's also very easy to adjust. People said contrast and brightness knobs were hard to use. So we replaced them with soft touch buttons that *electronically* adjust screen settings at your command. Then we really got creative.

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Can you imagine your desktop PC without a tilt and swivel display? Neither could we. So why not incorporate

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—PC Magazine,
Service and Reliability issue,
May 26, 1992

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**Future
likelihood of
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the vendor**



**Satisfaction
with repair service**



**Satisfaction
with technical
support**



A. YOUR PERSONAL INFORMATION

Please complete all appropriate sections, *providing at least two years residence and employment history. THIS IS NOT A CREDIT AGREEMENT!* One will be sent to you upon authorization of an account. (This form must be signed to process your application.) All financed purchases are subject to credit approval. *If you have any credit questions, please call 800-421-8942 for assistance. Thank you!*

Name _____ Previous Address _____
Home Phone (_____) _____ City _____ State _____ Zip _____
Soc. Sec. No. _____ Date of Birth ____/____/____ Employer _____ Since? (Mo./Yr.) _____
Address _____ Apt. _____ Monthly Gross Salary \$ _____ Daytime Bus. Phone (_____) _____
City _____ State _____ Zip _____ Previous Employer _____ From _____ To _____
Since? (Mo./Yr.) _____ ☐ Buy ☐ Rent ☐ Other _____ Occupation _____

A married person may apply for individual credit. I am applying for (please check appropriate box)

☐ **JOINT CREDIT** with another person. Complete entire application.

☐ **INDIVIDUAL CREDIT** but rely on income or assets of another person as a basis for repaying the credit requested. Complete entire application

☐ **INDIVIDUAL CREDIT.** Do not complete section C.**

** If you are a married Wisconsin applicant, you must provide your spouse's information as indicated, even though your spouse may not be signing the contract

NOTICE TO WISCONSIN APPLICANTS:
YOU MUST DISCLOSE YOUR MARITAL STATUS

☐ married ☐ unmarried ☐ legally separated

Income from alimony, child support or separate maintenance payments need not be disclosed if you do not wish to have it considered as basis for repaying this obligation

Additional Monthly Income \$ _____ Source _____

Name & Address of Nearest Relative Not Living With You _____

Relationship _____

B. CREDIT INFORMATION

PLEASE TELL US IF YOU HAVE A

Checking Account ☐ Yes ☐ No
Savings Account ☐ Yes ☐ No

Y/N How Many?

Y/N How Many?

Bank Loan _____ Dept Store Charge Card _____

VISA _____ Credit Union Account _____

MasterCard _____ Other Major Charge Cards _____

Finance Company Loan _____

C. JOINT APPLICANT INFORMATION

Joint Applicant's Name _____

Soc. Sec. No. _____ Date of Birth ____/____/____

Address _____ Apt. _____

City _____ State _____ Zip _____

Home Phone (_____) _____ Date of Residence (Mo./Yr.) _____

Joint Applicant's Employer _____ Since? (Mo./Yr.) _____

Bus. Phone (_____) _____ Monthly Gross Salary \$ _____

CUSTOMER AUTHORIZATION

I authorize ZEOS International, Ltd. or its assignees to investigate credit records and to report my performance hereunder to credit agencies. I hereby certify that the following information is furnished to you for the purpose of obtaining credit and is true and correct to the best of my knowledge and belief.

Applicant's Signature _____ Date _____

Joint Applicant's Signature _____ Date _____

FOR MARRIED WISCONSIN APPLICANTS: I acknowledge that the obligation described herein is being incurred in the interest of my marriage or family

Buyer's Signature _____ Date _____

There are costs associated with the use of this credit card. To obtain more information about these costs, call us at 800-421-8942 or write to ZEOS, Z-Card Processing Center, 1301 Industrial Blvd., Minneapolis, MN 55413.

NY—A consumer credit report may be requested in connection with this application or in connection with updates, renewals or extensions of any credit granted as a result of this application. If I subsequently ask for this information, I will be informed whether or not such a report was requested and, if so, the name and address of the agency that furnished the report

OH—The Ohio laws against discrimination require that all creditors make credit equally available to all creditworthy customers and that credit reporting agencies maintain separate credit histories on each individual upon request. The Ohio Civil Rights Commission administers compliance with this law

*Financing not available in Alaska, Hawaii or outside the continental U.S.

ZCD-PCM-9302A

Z-CARD PRIORITY APPLICATION FAX NUMBER: 612-633-7507

Apply for your own Z-CardSM today!



Here's another great reason to buy a ZEOS system: the Z-CardSM! The Z-Card works just like a MasterCard or VISA—so you can charge your ZEOS purchases and pay in easy monthly installments. And since no down payment is required, it makes buying your new ZEOS system easier than ever!

You can apply for your very own Z-Card and low, low monthly payments right now. Simply fill out this application and fax it to 612-633-7507. Or mail it to **ZEOS International, Z-Card Processing Center, 1301 Industrial Blvd., Minneapolis, MN 55413.** We'll contact you as soon as your credit line is established, usually within 24 hours of receipt. Apply today!

you sophisticated trapping functions that let you control the ultimate quality of spot-color (also called two-color) separations.

QuarkXPress and Ventura Publisher with the Ventura Separator module can generate four-color separations—but only if the imported bitmapped images (in either .TIF or .DCS formats) contain pre-separated CMYK information. Only Ventura Publisher's ColorPro extension can convert RGB data into CMYK data.

To work successfully with a service bureau your software will have to do more than print four pieces of film. It must transmit detailed instructions to the prep house. Several different mechanisms are emerging as industry standards. OPI (Open Press Interface) comments give a service bureau invaluable information concerning the placement and size of picture files. In addition, SGML (Standard Generalized Markup Language) establishes a basic set of conventions to describe both the structure and formatting associated with a document. (For more information on SGML and its uses, read the sidebar "SGML: The Quiet Revolution.")

PAPERLESS PUBLICATIONS

If you are interested in the future of electronic publishing you must look past the paper-based publications with which we are all familiar, toward a time when electronic distribution of a publication will be commonplace. Of the four programs reviewed here, only FrameMaker has a companion on-screen document reader. The \$89 FrameViewer takes advantage of the electronic medium with hyperlinks that allow the reader to quickly navigate a document and OLE functions that can incorporate sound and video elements into an electronic publication.

To paraphrase Marshall McLuhan, in high-end desktop publishing the medium mirrors the message. Information in the 1990s is culled from many sources; it is constantly revised and annotated and then streamlined for high impact or easy consumption. While not perfect, the four programs reviewed here have responded to this new and challenging information model with increased workgroup capabilities, automated updating mechanisms, and state-of-the-art design tools. Any one of them can take your documents in new directions.

Aldus Corp.

Aldus PageMaker

BY LORI GRUNIN

After years of practically ruling PC-based desktop publishing, Aldus PageMaker (\$895) finds itself embattled by increasingly powerful low-cost products on one side, and by the long-awaited Windows versions of QuarkXPress and FrameMaker on the other. But for mid- to high-level DTP tasks, Aldus PageMaker, Version 4.0, holds up surprisingly well under the onslaught, retaining its crown as *the* program to use if you need to create sophisticated layouts and print them on a PCL printer.

By now, most users recognize PageMaker's true pasteboard-style design space and unique window-shade text boxes, which function similarly (but not identically) to the text frames found in other products. In PageMaker's case a "true" pasteboard implies, for example, that an item placed on the pasteboard remains in the same absolute position on the display, even if the user changes the current page. This means you don't need to cut and paste from one page to another; simply drag the element off to the side, change pages, and drag it back on.

It also means, however, that column guides are simply that—guides. When you initially flow text into a two-column page, PageMaker creates two appropriately sized window shades. If you subsequently decide that you prefer a three-column layout, you must either change the number of guides then close up the shades and reflow the story, or manually resize the shades to fit the new column grid.

The interface is fairly clean. You can choose paragraph styles from the style palette, select user-defined or predefined spot and process colors from the color palette, or pick

a tool from the tool palette. All other operations are performed via menu selections; PageMaker has not yet been updated to allow users to access commonly used operations from a toolbar or floating palette. It does have the requisite keyboard shortcuts for many operations, however.

STAKING OUT THE MIDDLE GROUND

Other packages in this review may be stronger than PageMaker on either long documents or on short publications, but PageMaker holds the middle ground: It is equally capable for both types of jobs.

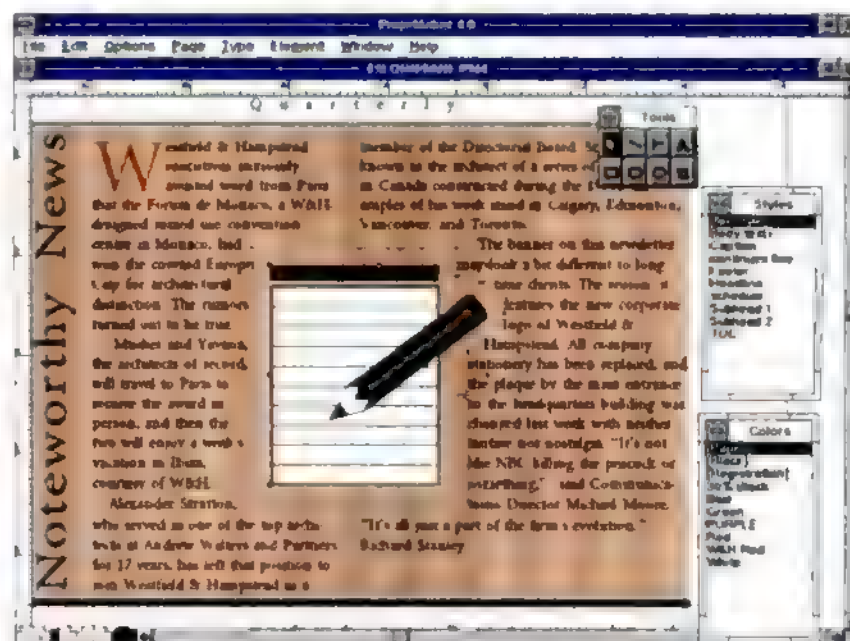
While PageMaker couldn't perform a few of the tasks during the creation of the newsletter—it could only rotate a section title in ninety-degree increments, it could not rotate the imported HPGL graphic (or any other graphic), and could not crop the photo to a nonrectangular shape—it took only a few hours to create a polished publication. The quality of both the color PostScript and LaserJet output (taking into account the limitations of the output devices) was excellent.

Similarly, although it lacks an equation editor, footnoting, and sophisticated page-numbering controls (such as automatic insertion of subhead prefixes in the page numbering), PageMaker proved competent at creating our long document. The program's Book feature lets

SUITABILITY TO TASK

Aldus PageMaker

	POOR	FAIR	GOOD	EXCELLENT
Highly designed publications	☐	☐	☒	☐
Long documents	☐	☐	☒	☐
Electronic publishing	N/A			
Workgroup publishing	☐	☐	☒	☐



To create an irregular text wrap in PageMaker, you simply click on the wrap bounding box to create a new node, then drag the node to conform to the shape of the object.

The ECOSYS a-Si Printer for the living world.

Only the Kyocera Corporation's dedication to preserving Earth's precious environment could have resulted in the ECOSYS™ amorphous silicon printer.

Drawing on its worldwide resources, Kyocera developed a new page printer with so radical a design ... it totally eliminates the need for the over 16 million laser cartridges that conventional laser printers spew into the environment, every year.

ECOSYS doesn't use pollution causing cartridges. With ECOSYS, you're helping with the solution, not adding to the problem. **Available now!** Introducing the new, RISC, 18 page per minute ECOSYS FS-3500A Network Printer! *Lowest cost of any network printer!**



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- WINNER -
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PRINTERS

Kyocera Ecosys a-Si Printer FS-1500A
Kyocera Electronics, Inc.



November 24, 1992
Ecosys a-Si Printer FS-1500A



ECOSYS
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*Calculated as cost of ownership
including consumables.

you assemble separate publications into one large publication (necessary if you want to use different page-numbering schemes), and PageMaker's sophisticated but fairly complex indexing system will generate a 3-level cross-publication index.

The program's link tracking, which informs you if any of the files used in a publication have changed since you last opened it, also allows you to update or change any linked files. The program also lets you share templates over a network. Combined, these are simple but powerful tools that reduce the burdens of workgroup publishing.

THE BUTS

But for all its ambidexterity, PageMaker has quite a few problems. In some cases, they're not really problems, just a case of the industry moving forward while the product stands still. Examples include the program's inability to group elements or to align tabs on anything other than a decimal point (such as a comma), and its lack of support for multiple simultaneous open layout windows in the layout editor (although you can have multiple Story Editor windows open while in layout view).

Other problems stem from Aldus's method of trying to place larger and



PageMaker did an excellent job printing the bitmap on the first page of our newsletter, and its Force Justify alignment setting made short work of our "The Quarterly Report" banner.

larger burdens on an increasingly shaky software architecture. You can only perform search-and-replace operations and spell-checks from within the Story Editor; the Story Editor can only support five simultaneous open windows, however, which makes a global search-and-replace

across stories difficult. For a long document with frequently recurring index entries, it's easy to reach the limit when using search-and-replace to insert index tokens (the quickest and easiest way to do so). Nor can PageMaker wrap text around text (to create the type of inset bylines we used in our newsletter); the program does not store the same type of bounding-box information for text blocks that it stores for graphics elements.

WHAT THE FUTURE HOLDS

In addition to addressing many of the problems found in Version 4.0, Aldus is gearing up Version 5.0 to take on QuarkXPress in a feature-for-feature battle. The new release, which is slated to ship in the first quarter of this year, will incorporate the features currently available in version 4.2 for the Macintosh—most importantly, Aldus's Additions technology. Additions, which can operate as interpreted macros, compiled macros, or compiled programs, greatly enhance the extensibility of the product. Aldus will also be updating PageMaker's interface, most notably with a Quark-like control palette and the ability to work with multiple simultaneously open publications; the company is also working to

■ Making the Most of In-line Graphics

by Luisa Simone

PageMaker contains a number of powerful formatting tools to automate document creation. But until Version 4.0 came along those functions, which include defined style sheets and automatic column creation, could only be applied to text—not pictures.

The current version of PageMaker does not offer formatting functions for pictures per se, but it does support in-line graphics. When you create an in-line graphic, PageMaker adopts a split personality toward the picture. With the arrow tool selected, PageMaker sees the object as a normal picture. You can, for example, resize and crop the image. With the text tool selected, PageMaker treats the picture as though

it were just another character in your story.

Of course you can't apply font, point size, position, or type style attributes to an in-line graphic; after all, it is not a true letter. But you can apply any paragraph-level format to an in-line graphic, as long as you remember to put a carriage return before and after the picture.

Here are just a few of the possible design applications:

- You can center a picture perfectly within a column by making it an in-line graphic and using the Center alignment option. The only caveat is that the column must be wider than the graphic.
- You can save yourself the hassle of drawing and aligning rules above or be-

low each and every picture in a document. Simply create a defined style and include automated paragraph rules. Just as with text, you can specify the position of the rule in relation to the baseline, you can choose a color for the rule, and you can have the rule span the entire width of the column or only the width of the picture. Best of all, you can rest assured that every picture in your document will be formatted identically.

- You can use PageMaker's Paragraph Options to automatically position pictures on the page. For example, the Column Break Before or Page Break Before options will guarantee that an in-line icon always appears at the top of a page—even if the text reflows. □

The ECOSYS a-Si Printer for the business world.



A world of savings

We've just made your day! Because the new ECOSYS™ 10 and 18 page per minute amorphous silicon (aSi) printers cost less than a penny a page to run. An astonishing 68% less than those costly laser cartridge printers. Bank on it.

In fact, at less than a penny per page, ECOSYS features the lowest operating cost of any page printer, ever. (So low, it can make originals for less than the cost of a photocopy.) Compare that to 3.1¢ per page for cartridge printers.

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A high volume network user can save over \$3,800 a year per printer. Just multiply that by the number of printers in your network. (Even a desktop user can save the entire price of a new printer in just a few years.)

Breakthrough after breakthrough

ECOSYS imaging technology has resulted in a print engine so long lasting that it will last over 75 times longer than a laser cartridge. Yet, amazingly, the ECOSYS takes up less than 1/2 the space of the LaserJet III®!

Its compact LED printhead with unique image resolution system allows up to 300x1200 dpi resolution. While ECOTONE™ microfine ceramic toner actually cleans, polishes and reconditions the print drum with every use.

ECOSYS offers an unprecedented range of upgradable features. Like two 500 sheet paper drawers, duplexing unit, 15-bin sorter/stacker/electronic mailbox and power envelope feeder. Offers unsurpassed compatibility too, with 6 standard emulations including PCL-5 and features like KPDL, Kyocera's optional PostScript compatible interpreter. Plus networking features like plug-in Token Ring, Ethernet and AppleTalk solutions.

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Covering all parts and labor, Kyocera offers a 1 year or 300,000 page limited warranty on the total system. Plus a 3 year or 300,000 page limited warranty on the imaging system. Kyocera also offers ECOCARE™ our affordable on-site service program, and the more comprehensive ECOCARE PLUS™ featuring on-site service support for 3 full years.*

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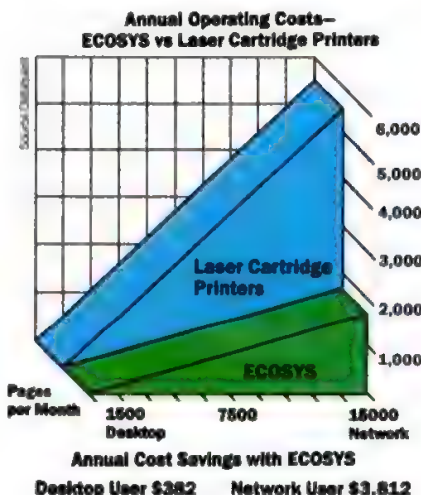
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FACT FILE

Aldus PageMaker, Version 4.0

Aldus Corp., 411 First Ave. South,
Seattle, WA 98104; 206-628-2320;
fax, 206-343-3360

List price: \$895.

Requires: 286-based PC or better, 4MB RAM, 6MB hard disk space, DOS 3.02 or later, Microsoft Windows 3.x (386-based PC or better and 20MB hard disk space recommended).

In short: For mid- to high-level desktop publishing tasks, Aldus PageMaker retains its crown as the program to use if you need to create sophisticated layouts and print them on a PCL printer; it's also the program of choice if your work includes a variety of both long and short publications.



ON READER SERVICE CARD

optimize PageMaker's screen display and printing performance.

Most of the other capabilities being added to help PageMaker attain feature parity with QuarkXPress, such as skewing and flipping, will be implemented via Additions rather than through changes in the program's core code. Although in many cases the end user will not really notice the difference—just another menu selection—only time will tell whether Aldus can get another few good years out of an aging executable.

If you're a PageMaker user and you need more complex design and typography tools, whether to fight for PageMaker or switch to QuarkXPress depends upon how much time, money, and energy you've invested in your current PageMaker templates and how long you can wait for Version 5.0. For the new purchaser with less sophisticated needs or with a LaserJet printer, there are still plenty of reasons to opt for the venerable PageMaker.

Frame Technology Corp.

FrameMaker 3.0 for Windows

BY JAMES KARNEY

The collection of power tools for handling long complex documents in FrameMaker 3.0 for Windows sets it

SGML: The Quiet Revolution

by James Karney

SGML is becoming the four-letter word of choice in the publishing industry. Its popularity has been described as the "quiet revolution": No one understands it, but over the past few years its following has grown anyway. The acronym stands for Standard Generalized Markup Language (ISO 8879), and it's a system for describing the structure, in addition to the format, of a document. SGML tags explain the relationship of elements in a publication. The document is ASCII text, with references to graphics or other external elements. The result is a file that can be moved easily from one operating system or application to another without losing access to an existing electronic library.

This interoperability is one of the main reasons that government agen-

cies and their major contractors are adopting SGML to produce a wide range of documents.

Another reason is that tagged data can be stored in a central repository and called for use by more than one application, thereby opening the door to full-scale electronic publishing and real-time on-demand documentation. For example, a single warning about handling a hazardous substance can be stored and referenced in several publications. If the information is changed, all the references will be automatically updated.

An SGML document has three parts. The Declaration is a header that contains system-specific information such as the character codes used, as well as key combinations that can't occur and their replacements (such as Ctrl-Alt-Dei). The second part is the Document Type Definition (DTD), a

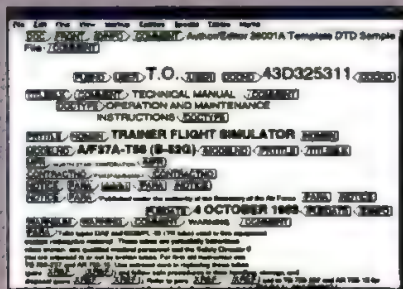
template of all the tags and how they can be used for a specific type of document, such as a technical manual. For example, the DTD can indicate that in technical manuals a section title must come after a chapter title, never after a paragraph. It also contains information about the type and use of any nontext or other external entities that can be used in the publication. The final part of the SGML document is the Document Instance. This is the actual text and its accompanying tags as set forth in the DTD.

Most SGML tools are currently available only for Unix, but that will change soon. Frame Technology Corp. has announced plans for a filter, and even WordPerfect Corp. has an SGML product in beta test. SoftQuad's Author/Editor is an SGML editor that comes in Windows and

Mac versions (\$995; SoftQuad Inc., Toronto, Ontario, Canada; 800-387-2777, 416-239-4801). Zandar's TagWrite, reviewed in the November 26, 1991, issue of *PC Magazine*, can translate almost any word processing file in and out of SGML

(\$1,200; Zandar Corp., Jericho, Vermont; 802-899-1058). IBM, Xerox, Avalanche Development, Frame, and others are working on solutions and considering how to address the desktop and electronic publishing markets.

Other developers balk at adopting SGML, asserting that the current specification is unwieldy and awkward to implement, generally because of the data structure of their file formats. If you are involved in large-scale or technical publishing, a vendor's willingness to adapt to the emerging SGML market may soon play a key role in your buying decision. □



This screenshot of the Document Type Definition section of an SGML document shows how the tags are embedded within an SGML document.

GRAPHICS High-End DTP

apart from the other packages reviewed in this issue. The \$695 program is billed as a document processor by its creator, Frame Technology Corp., since FrameMaker goes far beyond the capabilities of a simple layout program. It includes tag-based formatting, along with built-in word processing, drawing tools, a very sophisticated equation editor, support for conditional text, and the ability to produce on-line hypertext documents.

The program uses a combination of on-screen toolboxes and dialog boxes for drawing tools, mode selection, and formatting. FrameMaker allows you to create character-level formatting tags as well as paragraph-level ones. Master pages hold repeating elements such as headers, footers, and decorating rules, and reference pages contain boilerplate text and

available as part of the tag definitions.

The package had no problems automatically generating the table of contents and index in our test document. It couldn't, however, add the leader tabs as the file was created; they had to be manually placed later. The only real problem we encountered was with forcing a footnote to jump between pages. The dialog box offers a setting for the maximum vertical space a footnote can occupy on a single page, and when the amount of text exceeds the limit, the extra characters should be forced to the next page. Instead, the paragraphs scrolled up, running right off the upper margin of the page. Frame's technical support admitted it was a reported bug and said they were working on a solution.

Producing the test equation was simple. Even someone without mathematical training can duplicate complex forms using the WYSIWYG editor. To add an element you just click on the button labeled with the desired element, then replace any values denoted by the question mark placeholders. Once the equation is complete, FrameMaker can automatically reduce it to a simpler form.

FrameMaker also offers exceptional on-line document support for a product in this price range. You can embed hypertext links and hypermedia objects in any file, and several well-known firms are



WH Quarterly

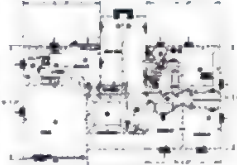
The Wicksburg Building: More Efficient

	1980	1981	1982	1983
Costs				
Building structure	\$105,000	\$105,000	\$105,000	\$105,000
Architectural services	\$12,000	\$12,000	\$12,000	\$12,000
Construction management	\$44,000	\$44,000	\$44,000	\$44,000
Estimated operating expenses	\$145,000	\$145,000	\$145,000	\$145,000
Estimated net operating income	\$100,000	\$100,000	\$100,000	\$100,000
Net Present Value	\$100,000	\$100,000	\$100,000	\$100,000

then a year. While they were busy retooling the ventilation system, the architects also suggested that new thermal windows be installed on every floor of the building, replacing windows dating from 1940. Though the replacement windows look no different to the eye (or architecture critics), they save approximately \$40,000-\$50,000 a year on heating costs by keeping the cold air out and warm air in. In summer, the windows also keep the cold air in, and the new air-conditioning system, which circulates air through the W & H ductwork, is also a big savings device. —Continued, page 4

Los Angeles. Following the American West the exhibition will travel to London's Tate Gallery and the Centre de Pompidou in Paris. Each museum on the itinerary will fund its own mounting of the exhibition, but W & H will cover all the shipping and overhead costs. In each city, a series of paid previews will be organized. Clients of W & H will receive complimentary tickets as well as hardcover copies of the show's lavishly illustrated catalog. The accompanying schedule of exhibition dates highlights those cities in which W & H maintains a regional office and lists the event coordinator to whom guest bids should be sent. —Paul Sharple

Winter 1992



FrameMaker accurately imported our HPGL test file (lower-right corner), although it erroneously interpreted certain types of solid lines as dotted.

SUITABILITY TO TASK

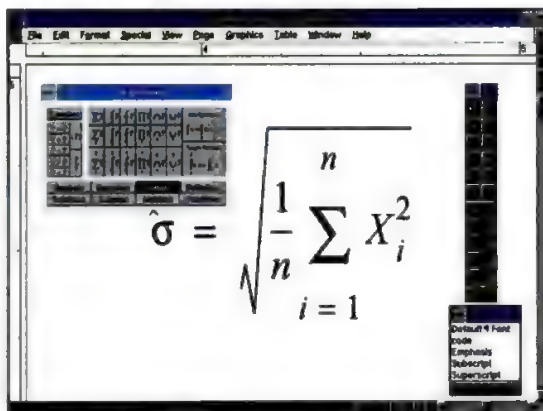
FrameMaker for Windows

	POOR	FAIR	GOOD	EXCELLENT
Highly designed publications	●	●	○	○
Long documents	●	●	●	●
Electronic publishing	●	●	●	●
Workgroup publishing	●	●	○	○

repeating graphics elements. More than one document can be open at the same time, and formatting elements or complete tag sets can be copied between documents. You can import files directly, copying the text or graphic into a publication, or merely reference an element, so the actual text or object is only *borrowed* as it is needed.

BUILT TO GO THE DISTANCE

FrameMaker handled our long-document test with few problems. The program provides complete control over tabs and numbering. For example, we set the columns in the test tables as decimal tabs based on the comma location; we could have specified any character (including symbols) in any font as the reference object. When the package numbers your document, you can define a new series or section at any time, at any level, using building blocks



FrameMaker's full-featured equation editor not only lets you quickly and easily enter equations, it will also automatically reduce them to their simplest form.

using these features to produce electronic manuals for both in-house and customer use. FrameReader is an \$89 add-on that lets you view documents without having to use the main program. While FrameReader does not let you edit documents, you can use it to print all or part of a document. In late beta test at the time of this review, a Windows version of FrameReader should be available by the time you read this. Combined with FrameMaker's ability to reference outside files, it provides the tools you need to produce on-demand electronic publishing.

FrameMaker files can be exchanged among any of the 24 versions running under Unix, plus Macintosh and Windows platforms—and the interface is almost identical throughout. We loaded sample documents created in the SCO Unix version and Mac product on the new Windows release without difficulty. FrameMaker also supports a special version of the nCode language for marking up plain text files, which can be created in any program that can export a plain ASCII file. One minus, however, is FrameMaker's limited network support. FrameMaker for Windows offers only a warning if the file or template being opened is in use by another person; the user can ignore

■ Customize Documents With Conditional Text

by James Karney

If you have to maintain several versions of a document or manage complex documents that will be used by different types of users, FrameMaker's "conditional text" will give you powerful new controls. You can use it to replace, show, or hide any element used in a publication. For example, you can use conditional text to author two versions of a textbook: one for teachers that includes answers to all exercises, and another for students that omits the answers.

Designing a publication with conditional objects means doing some extra planning and defining a set of consistent standards. The program uses a special tag to identify and format an

object, in addition to an item's normal formatting tag. Setting the Show or Hide option includes or removes an element from the display or printout. The condition tag also can be set to override part of the formatting normally used for a type of block.

To make it easier for your readers to identify conditional text, be sure to format it in a uniform way throughout your document, either by using a specific font attribute or color to set it apart. This also makes it easier for you to locate such elements for revisions. If you're importing conditional objects, such as graphics or spreadsheets, you'll want to plan the disk location of those files so they are easy to locate and archive later. □

the message and work on the file unless the user has specified that it be read-only.

A new product, FrameBuilder, was announced at this fall's Seybold Conference. According to the company, it will provide guided authoring of documents, validation of design structures (such as order of required elements), and the ability to import compound documents from other applications such as Microsoft Word and WordPerfect. A filter for FrameBuilder is planned to allow import and export of SGML publications and support for DTDs in the future. (For more information on SGML, read the sidebar "SGML: The Quiet Revolution"). The new package will be released for the Unix platforms first, with other versions scheduled to follow later in the year.

NO FREE LUNCHES

While FrameMaker excels in several areas, the test newsletter proved more of a challenge; some tasks were too much for the program's capabilities. Importing text, placing white type over color pho-



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GRAPHICS High-End DTP

tos, and creating tables were no problem. But irregularly shaped frames and process colors were out of the question. One of the program's major drawbacks is its inability to automatically wrap text around a graphic: You must force each line of text into a separate frame, and then move them manually. This is not only tedious, but can cause additional problems. When I used that technique to wrap lines around the clipboard graphic on page four of our newsletter, the proper leading was lost where the text flow changed.

Nor does FrameMaker offer any support for process color, and it only offers very limited spot-color abilities. Furthermore, the program does not let you place text freely within a frame. Getting the word "Itinerary" centered in a tinted box was an arduous task. The schedule of upcoming events on page two runs right to the upper left-hand edge of the frame, but it should be indented and have extra space at the top of the tinted box. While it is possible to achieve this effect with a good bit of effort, it requires too much of a workaround.

If you don't need to design complicated newsletters, the limitations mentioned here may not bother you. But if you do then FrameMaker may not provide an adequate solution. FrameMaker takes a bit of practice to master, but if

PC FACT FILE EDITOR'S CHOICE

FrameMaker 3.0 for Windows

Frame Technology Corp., 100 Rincon
Circle, San Jose, CA 95131; 408-433-3311;
fax, 408-433-1928

List price: \$795.

Requires: 386-based PC or better, 4MB RAM, 10MB hard disk space (20MB recommended), DOS 3.1 or later, Microsoft Windows 3.x.

In short: FrameMaker 3.0 for

Windows takes a bit of learning, but if you're looking for a long-document powerhouse that runs on a variety of platforms, it's probably your best choice. While it doesn't offer much in the way of color support or detailed design tools, it can turn out heavy-duty structured documents with ease.

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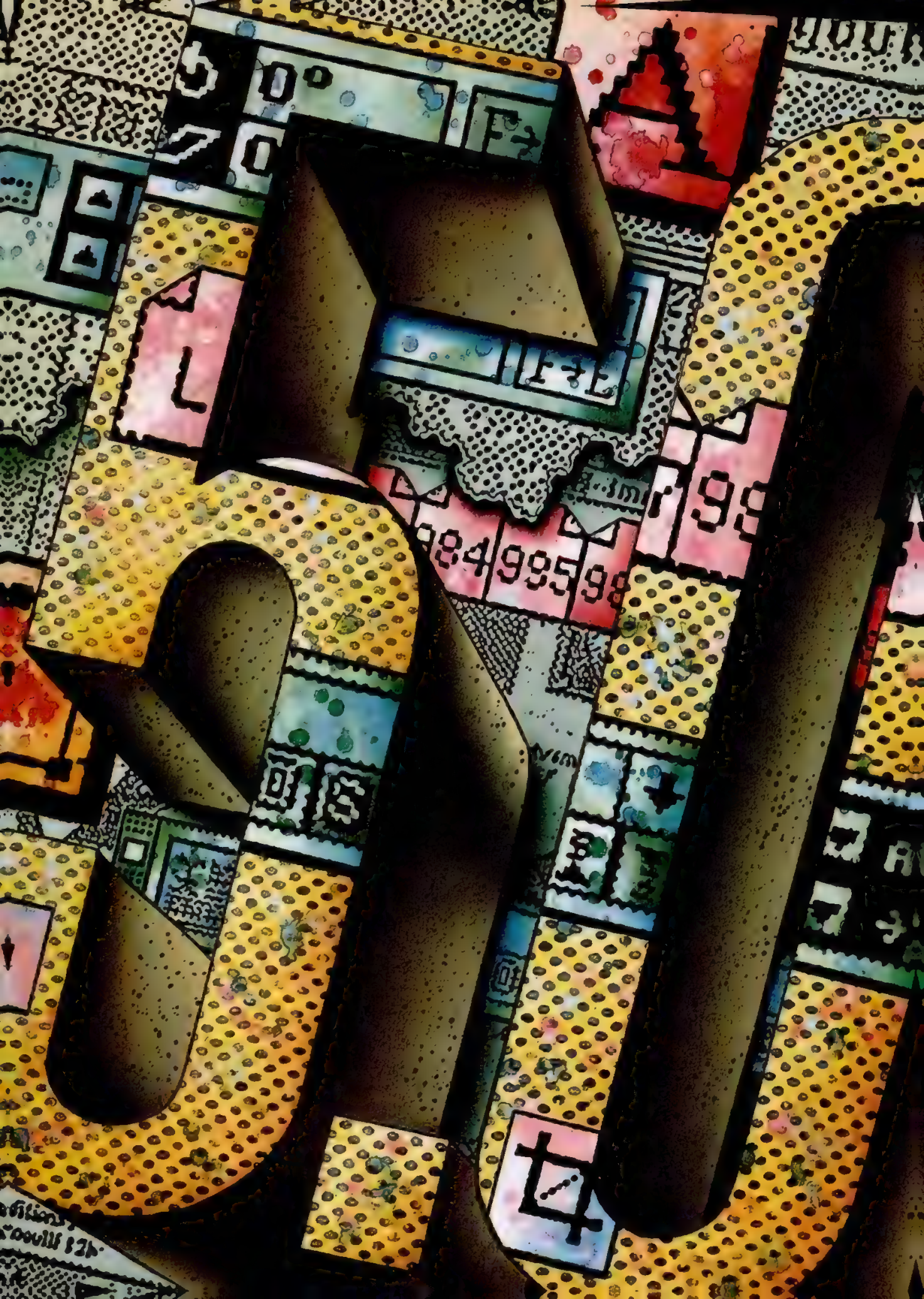
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you're looking for a long-document powerhouse that runs on a variety of platforms, it may well be your best choice. Don't expect the product to handle color (other than in imported graphics) or offer detailed design tools, but do expect it to turn out heavy-duty structured documents with nary a hitch.

Quark Inc.

QuarkXPress for Windows

BY LUISA SIMONE

PC users have anticipated the arrival of QuarkXPress for Windows for years—literally. Now that this \$895 program is finally shipping, one important question remains: Does QuarkXPress for Windows, Version 3.1, live up to our expectations?

The answer is a definite yes.

QuarkXPress's design tools are not only powerful, they are easy to access. QuarkXPress accommodates the professional designer by bringing every conceivable function up to the surface of the program in the form of floating palettes.

Seven different palettes give art directors the opportunity to do what they do best: tweak. Tweaking is a lot easier when

you don't have to constantly open and close menu and dialog boxes. For example, you can reposition elements on a page by .001 points simply by entering the x,y coordinate values into the Measurements palette.

The Library palette is a handy way to store and retrieve frequently used pictures, logos, and even text elements. And in addition to its navigation functions, the Document Layout palette can contain 127 different master-page designs. So adding a sidebar page (complete with unique column widths, picture treatments, and text styles) is as easy as choosing the appropriate master design from a drop-down menu.

Many of QuarkXPress's features are best understood within the context of a professional design studio and production environment. The program can translate named colors (using TruMatch, PMS, Focoltone, RGB, or HSB color models) into their printable CMYK equivalents. In addition, QuarkXPress can directly generate four-

W&H Acquires Spatial Relations Leading Interior Architecture Firm

By Richard Stanley
Winfield and Hampstead has taken an important step toward becoming one of the nation's largest full-service architecture firms with its acquisition of Spatial Relations, a Chicago-based interior architecture design group. W & H Director Jonathan Aston told reporters, "By bringing Spatial Relations into the W & H fold, we're going to have a firm that's ready to answer all the client's questions and satisfy all his needs, from the first son of gun to the last carpet tack." Five-year-old Spatial Relations, which like W & H, a company's identity forcefully set with a great sense of purpose last year and has produced billings of \$37 million this year. Throughout its history, Spatial Relations has been a leading force in advocating open-plan designs for offices that allow for quick and easy reorganization and space allocation changes to house designers at the firm actually created many of the room dividers and office furniture that you see in offices all over the world today. Spatial Relations has also made a name for itself with innovative executive suite and boardroom designs that assert a company's identity.

W&H Sponsors Major Mies Retrospective

A major Mies van der Rohe retrospective exhibition will travel to the great hall of the Metropolitan Museum of Art. Contact: Jane Gritz
May 19th: Chicago The Art Institute of Chicago will present a quarter-century of the Mies exhibition starting at 11 a.m. A guided tour and lecture. Contact: Gail Morgan
July 12th: Los Angeles Following a champagne buffet at the Museum of Contemporary Art, guests will attend an architectural presentation viewing the actual drawings on location. Contact: Museum Mies
September 16th: Denver A grand afternoon viewing at the Tate Gallery and high tea will introduce the British clients to the exhibition. Contact: Penelope Widdowson

Page 2

QuarkXPress can easily create elliptical picture frames, such as the one shown here. The imported gray-scale TIFF image was both tinted blue and lightened using Quark's Style menu.

Wrap Text Inside a Graphic

by Luisa Simone

QuarkXPress offers a totally unique function that lets you place text *inside* an irregular shape. Here's how to create this unusual text effect.

First, create a text frame and either import or type your copy. Then draw a picture frame and import a picture: It helps if the picture has a clearly defined outline.

Position the picture frame over the text frame. Be sure that the box containing the text is one level behind the picture you want to use. If you've drawn other objects, use the stacking commands to be sure that these two items are correctly layered.

With the picture box selected, open the Runaround Specifications dialog box from the Item menu; choose the Manual Image option. Quark will now create an outline of

your picture. This outline—also called the runaround polygon—comes complete with handles that can be used to fine-tune the text wrap.

Click the Invert option box. This takes the text that should run around the irregular polygon and places it *inside* the irregular polygon. Click OK to return to your document.

You'll notice that the text is overprinting the actual picture. This may be the effect you want; If you don't want the text to overprint the picture, you can delete the picture without disrupting the text. QuarkXPress will leave the irregular polygon in place.

The relationship between the irregular polygon and the text that wraps within the polygon is quite stable. You can also resize the text box or the picture box and even reshape the polygon using Quark's tools. □

color separations from the CMYK information contained in imported TIFF and DCS files.

Even more impressive, QuarkXPress is the only program in this roundup that provides trapping controls. Since it gives you the option to choose one of two automatic trapping methods (absolute or proportional) and the ability to create custom trapping values for specific color pairs, QuarkXPress preps your film separations more thoroughly than dedicated PC-based separation programs.

ART DIRECTOR'S DREAM

QuarkXPress's powerful features make it possible to solve even the most thorny design problem quickly and easily. For example, the PC Magazine Labs sample newsletter contained several intricate text wraps. QuarkXPress's user-defined kerning and tracking functions made short work of fine-tuning the text wraps. We were able to subtly alter the word spacing and letter spacing to eliminate loose lines or to force a line break.

Still, we never even tapped all of QuarkXPress's power. It is unlikely that a business user will ever plumb the depths of QuarkXPress's typographic features: Only the most font-savvy of art directors



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ADOBE

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CIRCLE 368 ON READER SERVICE CARD

As they say, it's all in the genes. Introducing the ThinkPad™ from IBM. The slickest, sleekest little number that ever crunched one. A mere seven-and-a-half pounds of brains and beauty that begs you to take it anywhere. And once you own one, that's exactly what you'll do.



← All this in only 11.7" →

Introducing ThinkPad

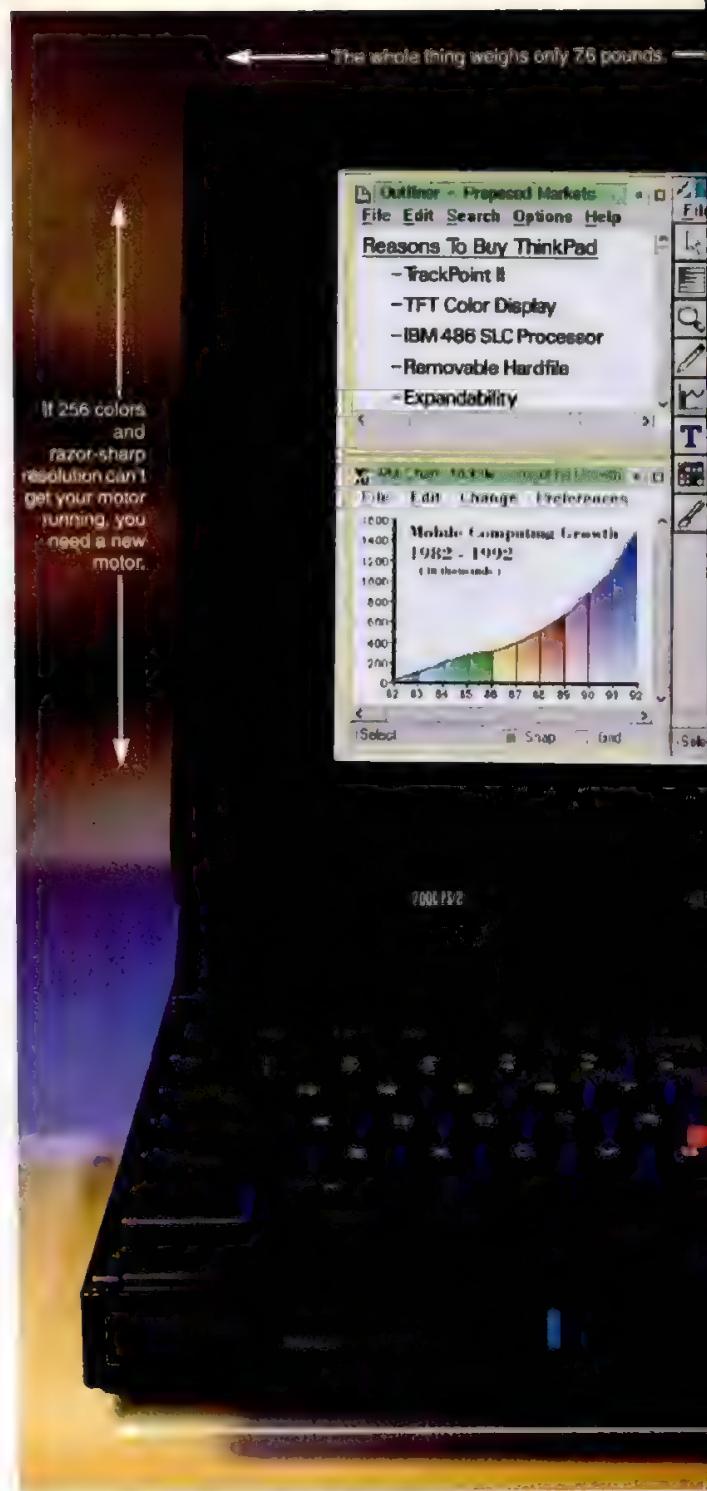
The top-of-the-line ThinkPad 700C sports a screaming 486 SLC™ 25 MHz processor. But it's built for comfort too. There's a surprisingly roomy interior, with a full-size, ergonomically designed keyboard. And a screen that literally bends over backwards.

Strategically placed on the keyboard is a little red spot called the TrackPoint II™. It does what a mouse would do with a few million more years of evolution. Nothing dangles; it's part of the soul of the machine. You can operate it with one fingertip. And it lets you think on any terrain, even one without any flat surfaces.

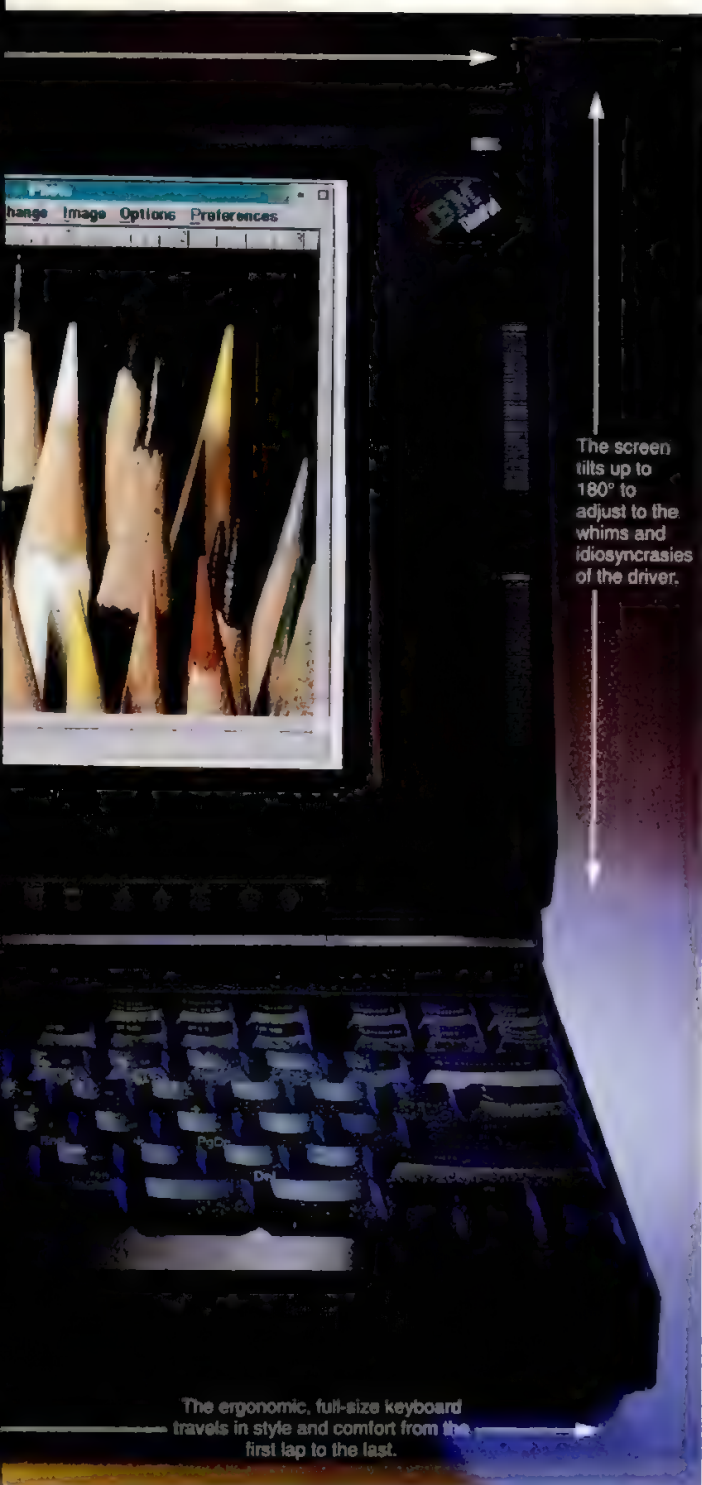
The ThinkPad's screen is a thing of almost aching beauty. Its 640 × 480 VGA resolution is sharper than that of many desktop computers. It displays 256 colors. And it's the biggest screen on any notebook. So it's very easy on the eyes.

The ThinkPad comes standard with things some other notebooks don't even offer as options. Like 4MB

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Its mother was Its father wa



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of memory upgradable to 16MB. 120MB of hard disk space. Pre-installed DOS 5.0 and PRODIGY.* You can soup it up with a turbo-charged 486SLC2 50/25 MHz processor—just one of the upgrade products IBM offers. And the hard disk is removable, so it's easy to upgrade and share your ThinkPad, not to mention the great security and virtually unlimited storage.

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GRAPHICS

High-End DTP

will want to access QuarkXPress's editable tracking and kerning tables. But all users will appreciate QuarkXPress's ability to create outline or shadow text as easily as most DTP programs create bold-facing or italics; and QuarkXPress can produce drop caps automatically.

Many of the product's drawing and design functions are pure creative fun. We used QuarkXPress's unique picture-frame tools to create an oval frame sur-

SUITABILITY TO TASK				
QuarkXPress for Windows				
	POOR	FAIR	GOOD	EXCELLENT
Highly designed publications	●	●	●	●
Long documents	●	○	○	○
Electronic publishing	N/A			
Workgroup publishing	●	○	○	○

rounding a bitmap in our test newsletter. In addition to irregularly shaped picture frames, QuarkXPress can create linear gradient fills, rotate text or pictures in .001-degree increments, skew pictures,

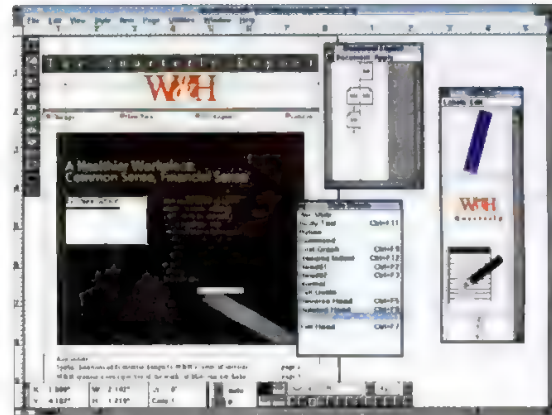
and generate lines up to 504 points in width. These tools are more than sufficient for creating diagrams, logos, and even simple illustrations.

Once you've created a drawing you can protect it using QuarkXPress's well-implemented grouping and locking functions. Even after you've grouped text and picture items you can use the Content tool to subselect the text frame and edit your copy.

KEEP IT SHORT

Creating our test long document, on the other hand, revealed many of QuarkXPress's limitations. QuarkXPress successfully imported the long text file and formatted the copy based on embedded style tags. And the Section command made short work of designating the start of subsequent chapters. We also had no trouble anchoring a graphic to text.

But QuarkXPress can't automatically generate a table of contents or an index.



QuarkXPress's Library palette lets you store and retrieve frequently used design elements, while you use the Document Layout palette to manage and navigate layout and master pages.

Other than page numbers (for the current, previous, or next text frame), the program contains no automatic numbering schemes.

ONE AT A TIME, PLEASE

A much more serious limitation is QuarkXPress's lack of workgroup publishing support. While we successfully ran QuarkXPress off of a file server, it re-

► SUMMARY OF FEATURES

High-End Desktop Publishing Software

All of the DTP products we reviewed have certain capabilities in common; some of the most important ones are listed below. The table on the following pages is designed to highlight the distinctive attributes of the various packages.

What All the Products Have in Common

General

- All products require 4MB RAM
- All run in the graphics modes supported by their operating environment
- All have a user-definable font grepping threshold.
- All have one level of Undo.
- All have on-line help
- All have a paper tutorial.
- All include sample files

Platform Support

- All support LANtastic, Microsoft LAN Manager, and NetWare

- All can run from a server (though only one instance of QuarkXPress can be open at a given time).
- All can share network printers.
- All support the Macintosh platform and Windows.

Document Layout

- All allow editing in facing-pages view.
- All allow you to specify custom page sizes.
- All can automatically create new pages during text import.
- All let you add and remove pages.
- All let you start numbering at a new page number.
- All do consecutive numbering across a document
- All show the cursor position on the ruler.
- All offer column guides.
- All offer snap-to grids.

Fonts and Typography

- All support Adobe Type 1 fonts.
- All do all caps.
- All do colored or tinted type.
- All generate knockout type.
- All allow you to kern manually.
- All permit negative leading and tracking

Text Handling

- All can import plain and tagged ASCII text, as well as WordPerfect text files.
- All support paragraph styles.
- All let you manually override hyphenation.
- All can search and replace formatting attributes.

Graphics Handling

- All can link graphics to text in some way.
- All can import CGM files and EPS files with TIFF preview
- All can import monochrome and gray-scale .PCX and TIFF files.
- All can import Windows metafiles.
- All can draw lines, rectangles, circles, and ellipses.
- All provide fixed-percentage tints.
- All let you crop and scale graphics.

Output Support

- All let you select the number of copies to print.
- All can print trim marks.
- All can output to any device supported by the operating environment.

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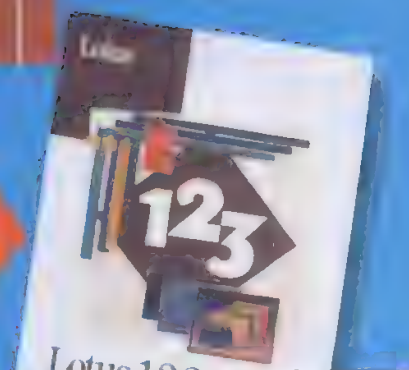
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Sprout!

Sprout! is a complete computer planning tool for vegetable gardeners. Its unique planting tool snaps to correct row and plant spacings and automatically fills in plant symbols, producing a graphic, scalable garden plan. In addition, Sprout! contains a fully editable database of vegetables for 7 climate regions containing planting and harvesting times, yield, soil pH growing tips, and other information. Create your own vegetable symbols and customize garden designs. Sprout! prints out garden layouts, calendars, shopping lists, and reports.

Publisher: Abracadata
HH0094

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Design Your Own Home: Architecture Interiors, Landscape

With Architecture, you can draw professional quality floor plans, side view building plans and structural details in record time, trimming home improvement costs. Architecture automatically calculates all distances, angles and angles. Interiors is a beautifully simple approach to a more beautiful home. Arrange and rearrange furnishings in seconds. Explore subtle color schemes and variations. Switch from top views to side views. Landscape is easy to use and can help prevent costly mistakes. Position flowers, shrubs, trees, walks, steps, fences, etc. for the look you want. Dozens of sample plans are included with each version. Modify them or create your own.

Publisher: Abracadata
Interiors EN2704
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Publisher: Abracadata EN2684



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VideoSpigot for Windows

VideoSpigot™ turns full-motion footage into fully digital data. Video for Windows™ aware applications allow you to manipulate, cut, and paste frame by frame, as easily as you can with text and graphics. It captures and digitizes VHS, PAL, and S-VHS video in real time. Capture up to 30 frames per second in photorealistic 24-bit color in a 160 x 120 window on 486- and 486-based systems. High performance CODEC software conserves disk space without compromising image quality. And you get realistic playback in Windows up to 320 x 240 depending on your graphics card. VideoSpigot for Windows includes Microsoft Video for Windows and these products by Asymetrix - MediaBlitz™, Multimedia Toolkit™, and Multimedia Make Your Point™ (over \$1000 retail value). Also available: SuperMatch™ 77 MT0530 \$999.

Publisher: SuperMatch GR635+

\$449

★Thunder/24 for Windows EISA

For high-speed, large-screen, 24-bit true color with advanced image handling, Thunder/24 is the optimal price-performance solution. This 24-bit graphics accelerator lets you grab objects, resize windows, cut and paste images, and scroll through text up to 500% faster than unaccelerated VGA cards. While 8- or 16-bit cards merely approximate continuous tone color, Thunder/24 for Windows provides the 24-bit true color palette essential for manipulating photographs and making color separations. Its Virtual Desktop feature provides an 1152x910 workspace for viewing entire outsized true-color layouts. Hardware-based zoom provides 200% magnification. Also available: Thunder/24 EISA Bundle with QuarkXPress EX2550 \$2699, Thunder/24 for Windows ISA EX2560 \$1599, SuperMatch 17 MT0530 \$999, SuperMatch 20T MT0540 \$2749. Publisher: SuperMatch EX2630

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► SUMMARY OF FEATURES

High-End Desktop Publishing Software

Products listed in alphabetical order

■ = YES □ = NO

	Aldus PageMaker	FrameMaker for Windows	QuarkXPress for Windows	Ventura Publisher for Windows	Ventura Publisher, OS/2 Edition
List price	\$895	\$795	\$895	\$795	\$795
Operating environment	Windows	Windows	Windows	Windows	OS/2
General					
Technical support hours (eastern time)	10:00–8:00 M–F	10:00–5:00 M–F	9:00–8:00 M–F	10:00–7:00 M–F	10:00–7:00 M–F
Disk space required	6MB–8MB	10MB–20MB	6MB–8MB	5MB–14MB	1.5MB–2MB
Redo	□	■	■	■	□
Simultaneous open documents	□	■	■	□	□
Network and Platform Support					
Interapplication connectivity	DOE client	OLE client	OLE client (graphics only)	OLE client	None
File locking	■	■	■	■	□
Users can share documents/templates	□ ■	■ ■	□ □	□ □	□ ■
Other platforms supported	None	Unix	None	GEM	GEM
Document Layout					
Maximum number of master pages per document	2 (1 left, 1 right)	25	127	None	None
Maximum number of columns	20	Unlimited	30	8	8
Maximum page size (inches)	17 x 22	48 x 48	48 x 48	18 x 24	18 x 24
Maximum pages per document	999	Unlimited	Unlimited	9,999	9,999
Thumbnail display	□	■	■	□	□
Reorder pages via thumbnails	N/A	□	■	N/A	N/A
User can rearrange pages	□	■	■	□	□
User can employ section-page numbering scheme	□	■	■	■	■
Alignment options:					
Independent x and y rulers	■	□	■	■	■
Freeform guides	■	□	■	□	□
Lock frames	N/A	■	■	□	□
Fonts and Typography					
Font formats supported:					
Agfa Intellifont/Bitstream Speedo	■ ■	■ ■	□ □	■ ■	■ ■
TrueType	■	■	■	■	N/A
Supports embedding	□	■	□	■	N/A
HP cartridge fonts	■	■	□	■	■
Range of point sizes supported	4–650	4–400	2–720	2–254	1–254
User can adjust baseline	■	□	■	■	■
Ligatures/Automatic kerning	□ □	□ ■	□ ■	■ ■	■ ■
Free text rotation	□	□	■	□	□
User-definable tracking	□	■	■	■	■
Editable kerning and tracking tables	□	□	■	□	□
Automatic drop caps	□	□	■	■	■
Maximum characters/Maximum lines deep	N/A	N/A	8/8	1/Unlimited	1/Unlimited
Text Handling					
Automatic bulleted and numbered lists	□	■	□	■	■
Conditional text	□	■	□	□	□
Character styles/Section styles	□ □	■ ■	■ □	□ □	□ □
Vertical alignment and justification	□	■	■	■	■
Search-and-replace:					
Nonprinting characters/Special characters	■ ■	■ ■	■ □	■ ■	□ □
Named styles	■	■	□	■	■
Spell-checker/Table editor	■ ■	■ ■	■ □	■ ■	□ ■
Text import:					
DCA/RTF	■ ■	■ ■	□ ■	■ □	■ □

N/A—Not applicable: The product does not have this feature

CONTINUES

GRAPHICS

High-End DTP

► SUMMARY OF FEATURES

Products listed in alphabetical order		PC EDITORS CHOICE FrameMaker for Windows		PC EDITORS CHOICE QuarkXPress for Windows		Ventura Publisher for Windows		Ventura Publisher, OS/2 Edition			
■ = YES □ = NO		Aldus PageMaker		FrameMaker for Windows		QuarkXPress for Windows		Ventura Publisher for Windows		Ventura Publisher, OS/2 Edition	
Text Handling (continued)											
Microsoft Word/Word for Windows		■ ■		■ ■		□ ■		■ ■		■ □	
WordStar		■		■		□		■		■	
Can import stylesheets		■		■		■		■		□	
Data import:											
.DBF		■		■		□		□		□	
.WK?/.XLS		■ ■		■ ■		□ □		□ □		□ □	
Equation editor and language		□		■		□		■		■	
Graphics Handling											
Graphics file import:											
.BMP (DIB)		■		■		■		■		□	
.DRW (Micrografx)		■		■		■		□		□	
.DXF/HPGL		□ ■		■ ■		□ ■		□ ■		□ □	
EPS:											
Editable (.AI)		■		□		■		□		□	
DCS		□		□		■		■		□	
Can write EPS files		■		□		■		■		□	
.PCX (color/compressed)		■ □		■ ■		■ ■		■ ■		□ ■	
Intel TIFF (color/compressed)		■ ■		■ ■		■ ■		■ ■		□ □	
Motorola TIFF		■		□		■		■		□	
.WPG (WordPerfect Graphic)		■		■		□		■		□	
Color handling:											
Fill patterns/User-specified tints		■ ■		■ □		□ ■		■ ■		■ ■	
Color models supported		RGB, CMYK, Pantone		No color mixing		RGB, CMYK, HSB, Pantone, TrueMatch, Focoltone		RGB, CMYK, CMY, HLS, Pantone		RGB, CMYK, HLS	
Drawing tools:											
Bezier and freehand curves		□		■		□		□		□	
Polygon/Polyline		□ ■		■ ■		■ □		□ □		□ □	
Grouping		□		■		■		□		□	
Graphics frame shapes:											
Rectangle/Circle and ellipse		N/A		■ □		■ ■		■ □		■ □	
Regular polygon/Irregular polygon		N/A		■ □		■ ■		□ □		□ □	
Text wrap		■		□		■		■		■	
Around irregularly shaped graphic		■		N/A		■		■		□	
Within nonrectangular frame		■		N/A		■		□		□	
User can specify offset		■		N/A		■		■		■	
Flip/Mirror		□ □		■ □		□ □		■ ■		□ □	
Rotate		□		■		■		■		□	
Bitmap editing		Brightness, contrast		None		Contrast, posterize, tint (gray-scale only)		None		None	
Output Support											
Process-color separation:											
Black generation		□		N/A		□		■		N/A	
User can specify channel frequency and angle		□		N/A		□		■		N/A	
Maximum number of spot colors		Unlimited		8		Unlimited		Unlimited		8	
Can convert spot colors to CMYK		■		N/A		■		■		□	
Overprints/Knockouts		□ ■		□ ■		■ ■		■ ■		□ ■	
User can trap to or from any color		■		■		■		□		□	
User can specify halftone dot shape, angle, and frequency		■		□		■		■		■	
Prints negatives		□		□		■		■		□	
Prints registration marks/step scale		■ □		■ □		■ ■		■ ■		□ □	
Supports OPI		□		□		■		□		□	
Reports font usage/picture usage		□ □		■ □		■ ■		□ □		□ □	

N/A—Not applicable. The product does not have this feature

ENDS

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GRAPHICS

High-End DTP

PC
1993
EDITOR'S CHOICE

FACT FILE

QuarkXPress for Windows, Version 3.1

Quark Inc., 1800 Grant St., Denver, CO
80203; 800-788-7835, 303-894-8888



List price: \$895
Requires: 386-based PC or better, 4MB RAM, 6MB hard disk space, DOS 3.1 or later, Microsoft Windows 3.x (Recommended), 486-based PC, 100MB hard disk space for graphics-intensive publications, Super VGA adapter, PostScript-compatible printer if printing high-resolution images)

In short: We can finally welcome this Mac standard to the PC—and it was worth the wait. QuarkXPress isn't perfect for everyone, but it is perfect for anyone interested in producing artistically expressive, meticulously constructed, full-color documents.

482 ON READER SERVICE CARD

mains a single-user application. Like its Mac counterpart, QuarkXPress for Windows polls the network at start-up to determine if the same copy of QuarkXPress is currently in use. If it finds a duplicate copy (identified by serial number) it will not load. And unlike PageMaker, which allows multiple users to open untitled copies of a template, QuarkXPress doesn't create a copy of the template until you save the file.

QuarkXPress does earn some points for its picture-tracking capabilities. The program will tell you if the pointer to an externally stored picture is still intact and will alert you if the picture has been modified. You can then use the Update function to locate or import the latest version of the file.

It loses points for its lack of text-tracking capabilities, though. You cannot link, track, or automatically update a QuarkXPress document from an externally stored text file. You can use OLE as a workaround, but an OLE object can only appear within a picture frame. That means all of the text formatting must take place not in QuarkXPress, but in the originating application. Our testing also revealed quirky screen representations of OLE objects and glitchy PostScript printing of publications containing OLE objects.

Many of the workgroup features

"missing" from QuarkXPress will ultimately be available (as they are on the Mac) in the form of QuarkXtensions. By the time you read this review, a minimum of 15 different extensions will be available for Windows, including CopyFlow from North Atlantic Publishing Systems (which automates document creation) and Sonar Bookends from Virginia Systems Software Services (which generates indices and tables of contents).

The Mac and PC versions of QuarkXPress are almost identical functionally, and publication files are binary-compatible. The minor functional differences are usually attributed to the way in which each platform implements fonts. For example, the Mac version is more savvy about expert font sets and can even search for or spell-check ligatures.

In attempting to be more Mac-like, QuarkXPress for Windows sometimes overlooks important PC-user concerns. For example, while QuarkXPress can read and write a number of different word processing formats, it ignores Microsoft Word for DOS; nor can the program directly access Lotus 1-2-3 or Excel spreadsheets or dBASE files. The most serious drawback is QuarkXPress's crippled support of non-PostScript printers. Text (as long as it isn't rotated) will print just fine on a PCL printer. But pictures, tint boxes, and rotated text will all print at your monitor's resolution—around 72 or 90 dpi. And if you use a non-PostScript device for inexpensive color proofs, such as the popular HP DeskJet 500C, you'll be disappointed with QuarkXPress's black-and-white only output.

QuarkXPress isn't the perfect desktop publishing program for everyone. It is, however, the perfect desktop publishing program for anyone interested in producing artistically expressive, meticulously constructed, full-color documents.

Ventura Software Inc.

Ventura Publisher 4.1 for Windows Ventura Publisher, OS/2 Edition, Version 3.0

BY JAMES KARNEY

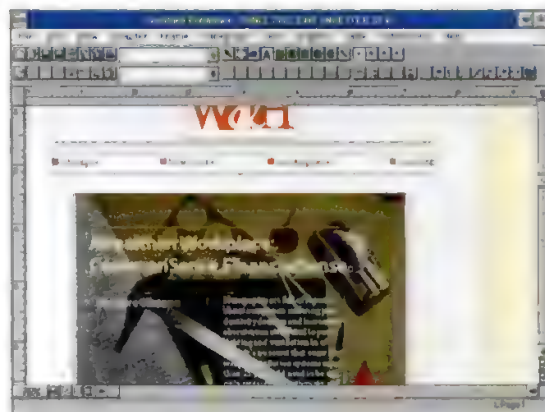
Ventura Publisher has undergone a face-lift, but it's only skin deep. With a \$795 price tag it has all the features of the earlier Professional Edition, with some interface enhancements thrown in. For added functionality, you'll need to turn to a suite of add-on modules. Two of these, Ventura Scan and Ventura Separator, are bundled with Ventura for Windows.

This upgrade sports a new, faster interface that takes some getting used to. Frame tags, en-

hanced page-movement controls, interactive tab placement, on-screen margin adjustment, and 3-D dialog boxes and rulers are among the enhancements. In addition, Ventura for Windows offers a new two-row button bar interface for setting options. This bar can be edited, so you can choose which shortcuts appear on the screen. You can access views of the current document via a pop-up menu located at the bottom of the work area. Veteran users can still opt for the classic toolbox and menus.

SUITABILITY TO TASK

	POOR	FAIR	GOOD	EXCELLENT
Highly designed publications	●	●	●	○
Long documents	●	●	●	○
Electronic publishing	N/A			
Workgroup publishing	●	○	○	○



Ventura has revamped Ventura Publisher's interface to take greater advantage of Windows 3.1. You can now access many of the product's features via innumerable icons.

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System Requirements: IBM AT or PS/2 (286 or higher) or 100% compatible (or any personal computer capable of running Microsoft Windows 3.0 or later), a minimum of 2 MB of available memory (RAM), 2 MB of free disk space, and a CGA, EGA, VGA screen or higher. (VGA or higher recommended) Requires Microsoft Windows 3.0 (with Multimedia Extensions) or later and DOS 4.01 or higher. A Windows compatible pointing device (mouse) is also recommended. Includes PC speaker driver for sound effects, Windows Multimedia Extensions or Windows 3.1 compatible sound board is optional.

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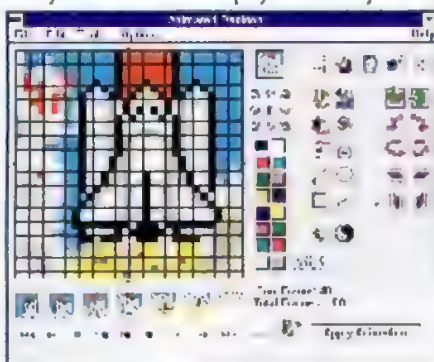
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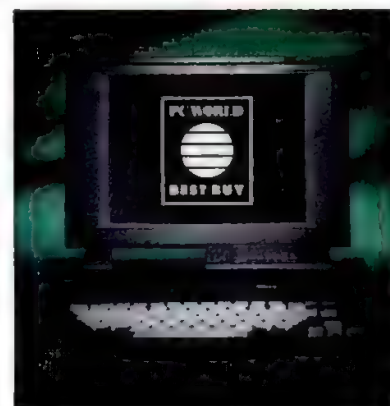


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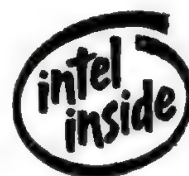
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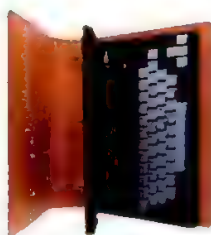
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- NICAD BATTERY
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- 8.3" x 11" x 1.8"
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Noteworthy News

Wentfield & Hampstead executive assembly awarded word from Paris that the Forum de Montecarlo, a WH&H designed, insured one competition center in Monaco had won the coveted Europe Cup for architectural distinction. The runners turned out to be none.

Shuster and Yonaka, the architects of record, will be named to Paris to receive the award on person, and then the two will enjoy a month's vacation in St. Tropez, courtesy of WH&H.

Alexander Strassman, who served as one of the top architects at Wentfield & Partners for 17 years, has

left that position to join Wentfield & Hampstead as a member of the Universal Board, location is best known as the architect of a series of office towers in Canada constructed during the 1970s.

Examples of his work stand in Calgary, Edmonton, Vancouver, and Toronto.

The bureau on this newsletter may look a bit different to longtime clients. The reason is features the new corporate logo of Wentfield & Hampstead. All company stationery has been replaced, and the plaque for the main entrance to the headquarters building was changed last week with neither fanfare nor rousal. "It's not like NBC, where the peacock or something," said Communications Director Michael Moore. "It's all just a part of the firm's evolution." —Richard Stanley —

Continued from page 3

made a name for itself with innovative executive suite and boardroom designs that aren't a company's identity forcibly yet with a great sense of style and taste. Perhaps most famous are the brushed aluminum-walled executive floors that the firm designed for American Aluminum and Cold at the company's Pittsburgh headquarters. As it turns out, that project was the first collaboration between formal relations and WH&H. Margaret Sallick and Catherine Clark, the married duo who started and currently run

the company will continue to head the operations as Spatial Relations becomes a division of WH&H. Spatial Relations of five will relocate to a vacant floor at W & H's headquarters (the interior design firm will, of course, design its own offices), and all its 19 employees are expected to make the move. For more information about Spatial Relations, please contact Sarah Tobias on the Spatial Relations Department at Wentfield & Hampstead, at the Chicago office.

be installed on every floor of the building, replacing windows dating from 1946. Though the replacement windows look no different to tenants (or architecture critics), they are approximately \$40,000-\$50,000 a year in heating costs by keeping the cold air out and warm air in. In summer, the windows also keep the cold air in, and the new air-conditioning system, which circulates air through the W & H-designed ducts, is also a big energy saver. Tenants at the Wentfield space building report an average reduction of 22 percent in electricity over the past year. Employees are enjoying better air, better lighting, and an overall healthier working atmosphere. The accompa-

Continued from page 3

Page 4

Winter 1992

To create an irregular wrap around the notepad graphic in Ventura Publisher, we used several strategically placed empty frames to offset the text.

Ventura is frame-based: Both text and graphics can be placed into frames, then cropped to fit into the allotted space. Text can be flowed directly onto a page, and will flow to following pages automatically, like in a word processor. All other frames are placed over this base page.

Paragraph formatting is controlled via tags, which can be applied manually with the mouse inside Ventura, or embedded at the front of a paragraph in the word

processor file. Settings are made through a series of dialog boxes to control font, leading, tags, and other formatting requirements. Character-level control is independent of the tag settings, but cannot be globally controlled with tags.

SOLID, WITH SHORTCOMINGS

Ventura for Windows is a mid-range performer, as evidenced by our long document test. Creating the basic layout, numbering, cross-referencing, footnoting, and generating a table of contents were straightforward. Defining the index was a bit tedious, but not a challenge. Since Ventura for Windows does not offer character-level tags, the codes contained in paragraphs in our test file had to be modified individually—a major drawback when working with very long files.

It took a bit of experimenting to get a result that resembled our test equation, though. Ventura uses a language similar to EQN in its equation editor, which operates in a special window over the regular page. There are bugs in the display of some combination forms, and the WYSIWYG sample lagged a bit while typing. If you are not familiar with such editors and need to print mathematical notations, expect to spend some time learning how to use it. The user manual

offers a start, but its explanations are quite limited.

There is a limit to the amount of text that can be contained in a file and the number of characters in a paragraph. As a result, you need to break a long document into a series of smaller files. Ventura calls a series of chapters a publication, but these chapters must be identified in a separate file before the program begins sequential autonumbering, building a TOC, or indexing. To save the resulting publication onto a disk, you must use the publication dialog box to specify chapters and the target drive/directory. Once the target locations have been identified, Ventura will automati-

SUITABILITY TO TASK				
Ventura Publisher, OS/2 Edition				
	POOR	FAIR	GOOD	EXCELLENT
Highly designed publications	●	●	○	○
Long documents	●	●	●	○
Electronic publishing	N/A			
Workgroup publishing	●	○	○	○

cally copy all related files. We ran into problems with a 24-bit TIFF file that was larger than the target disk; the operation had to be aborted and the file deleted from the chapter.

One area where Ventura shines is in color support. You can define any shade or tint for text using several color models. The included Separator extension mod-

Getting Consistent Frame Styles

by James Karney

If you need to apply a consistent style to frames and figures, try using frame tags, the latest addition to Ventura Publisher's arsenal of global formatting tools. In the past, each frame had to be formatted individually (with the exception of the underlying page). You could always set attributes for the color, border, columns, pad, margins, and local typographical controls for individual frames. But with its latest release Ventura has added the frame tags that let you change the attributes of all frames with a given tag, much the same

way you can format and reformat text using tags.

There are some differences, however. With text, any "untagged" paragraph is automatically assigned the body-text tag, which cannot be deleted. Untagged frames, though, are completely autonomous and do not have to be tagged at all. In fact, some, like headers, footers, footnotes, captions, the base page, and repeating frames, can not be tagged. Since captions are attached to another frame, you can use frame tags to define auto-numbering for all figures with the same tag.

Using the new tags is very simple.

You select or create a new frame, then open the Frame menu and choose Add New tag. Give the tag a name, then use the regular menu options to set any desired attributes. To apply the tag to another frame, you just select the object and choose the appropriate tag from the drop-down list on the button bar. To untag a frame you perform the same operation, choosing the No Tag option. Frame contents, location, anchor name, and graphics are not saved with the tag information, just the format. □

ule provides tools for defining spot colors using the Pantone Color Matching System and allows you to specify global corrections for four color separations. It can also be used to adjust the appearance of individual color images that have been imported into a chapter, as well as to define the angle and frequency of halftone screens, adjust for different paper stocks, or specify overprinting of a color. For even more sophisticated color printing, the optional ColorPro module (\$895) adds RGB-to-CMYK conversion, UCR and GCR, four-color tone curve control, softplate proofing, and press gain correction.

A MATTER OF SIZE

Ventura can handle layout and design elements reasonably well, but is not as sophisticated in this area as QuarkXPress or PageMaker. Like every other product in this roundup, Ventura could handle many, but not all, of the required tasks in our test newsletter.

Getting the graphics elements to fit in our newsletter was simple, it just required using the frame tool to size and crop the object. The frames around graphics are

limited to squares or rectangles, though, so we could not place the bitmap on page two in an oval. Since it wasn't a color image, we could not adjust it for brightness and contrast with the Separator module. And though it was easy to set the fill for

*One area where
Ventura shines is color
support. You can
define any shade or
tint using several
color models.*

the frame containing the word "Itinerary" on page two, we could not rotate the box in other than 90-degree increments. Ventura offers decimal tab setting, but you cannot define another character for alignment.

VENTURA FOR OS/2

If you have migrated to OS/2, there are two ways to add Ventura to your system. Version 4.1 will run as a Windows application. The older 3.0 version is available in an OS/2 Edition. We were able to load files from a logical DOS partition into both versions under OS/2 and did not notice any real performance differences. Version 3.0, designed for OS/2, suffers from a reduced feature set and an aging interface. While you do have multitasking and multithreading available with the OS/2 version, there are no drivers currently available for true-color, high-performance graphics adapters, and it has limited scanner support.

Ventura 4.1 should please users who work with medium-length publications or moderately intensive design. Its ease of learning and simple tagging system make it less intimidating than more sophisticated products like FrameMaker and Interleaf aimed at the long document market. With the ColorPro module, its color support is outstanding. While it lacks some design and drawing tools, it can be used to produce promotional material and most newsletters. This latest release offers a full-fledged Windows interface that should enhance its appeal. □

Miriam Liskin, PC Magazine, and FoxPro 2.0. Three Pros, No Cons.



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▶ FACT FILE

Ventura Publisher 4.1 for Windows

Ventura Publisher, OS/2 Edition, Version 3.0

*Ventura Software Inc., 15174 Innovation
Dr., San Diego, CA 91218; 619-673-0172*

List price: \$795.

Requires: Windows version:
286-based PC or better, 4MB
RAM, 5MB hard disk space, DOS
3.3 or later, Windows 3.x (386-
based PC and 20MB hard disk
space recommended).

Requires: OS/2 version: 286-
based PC or better, 4MB RAM,

1.5MB hard disk space, OS/2 1.21 or later (386-based
PC or better and 20MB hard disk space recommended).

In short: While Ventura lacks some design and drawing
tools, it's a worthwhile choice for medium-length
publications with moderate design demands. If you
want OS/2 support, go with the Windows version; the
OS/2 offering is based on the older Ventura 3.0 and
is showing its age.



ON READER SERVICE CARD

A vintage Macintosh computer is shown, displaying a color calibration chart on its screen. The chart features a central color bar with various hues and a grid of color patches. The Macintosh has a beige casing and a keyboard in front of it.

[illegible]

WORKGROUP SCHEDULING

Have Your Computer



Call My Computer

Today's software simplifies group scheduling. But are the products ready for prime time?



If communication is the lifeblood of any business, then meetings are surely the heartbeat. Alas, as anyone who has ever tried arranging a meeting among three or more busy people knows, finding a mutually acceptable time can be a job in itself. Fortunately, it's the kind of job that computers can do well: sorting through multiple schedules and finding a time that works for everyone.

Lots of people use computerized personal schedulers, of course. These range from modules in programs such as SideKick or the Windows Calendar to contact managers, such as TeleMagic or PackRat, that include scheduling as one of several tracking tools, but programs like these do not make the job of scheduling meetings any easier.

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by M. David Stone

Workgroup Scheduling

PERSONAL vs. WORKGROUP

The key missing ingredient in personal schedulers is coordination among several people. A program that can maintain an unlimited number of schedules, but keeps each one separate from the rest, is still a *personal* scheduler—even if it runs on a LAN.

A *workgroup* scheduler (or more simply, a group scheduler) must work with many schedules at once so that you could (and typically would) ask the program to find a time that's free for everyone in the group. A group scheduler may also provide such features as letting one user add items to another user's to-do list and even notifying the first user when the second checks off the item as finished. In short, it provides a tool for the workgroup as a whole, as well as a personal scheduling

tool for individuals in the workgroup.

None of these ideas are new to those who have been using workgroup scheduling programs on mainframes for years, but this type of software is relatively new to the PC environment. It had to wait for local and wide area networks to provide the necessary infrastructure, but now that the infrastructure exists, PC-based workgroup scheduling is rapidly becoming a reality.

WHAT WE'RE COVERING

In this, our first look at group schedulers, we started from the premise that interoperability is a key issue. Given that most offices have a mix of computers and operating systems, you're likely to want a program that runs on numerous platforms. Thus, our original intention was to limit

this overview to programs with both DOS and Microsoft Windows interfaces.

We found only four products that currently meet this requirement, however: CaLAnDar from Microsystems Software, Futurus Team from Futurus Corp., Network Scheduler 3 from PowerCore, and OnTime from Campbell Services. Because interoperability is so important, we've limited our in-depth reviews to these four. But because there are a large number of noteworthy programs that don't quite match our definition of multi-platform schedulers, we also decided to broaden our scope.

Accordingly, we've included briefer looks at three workgroup scheduling programs that support only DOS or Windows, as well as eight programs that offer group scheduling as one component of a larger suite—generally including some combination of time billing, project management, contact management, and communications. To make it easier to compare the programs, we've grouped them into three separate sections.

PUTTING SCHEDULING TO THE TEST

One important component of our testing was the ease with which the scheduling package integrated with the network. To this end, we always attempted to import user names from the network Bindery or an e-mail program.

To test the software's group and personal scheduling prowess, we judged the readability and completeness of the various schedule views. We then tested search capabilities under a variety of constraints, specifying time ranges, attendees, and locations for meetings. Testing included requests for multiple, alternative meeting times.

Once we scheduled appointment times, we tested notification, confirmation, and modification features, including RSVPs, alarms, and variable meeting priorities. We also tested the various access-control rights to determine how much privacy was possible—and whether users could control access for particular individuals.

A key part of our tests was to see how well the schedulers kept track of resources—meeting rooms and equipment. We created resource conflicts by attempting double bookings, and we experimented with taking resources out of

Suitability to Task:

Workgroup Schedulers

To be successful, a workgroup scheduling product must be able to work the way its users work. The product succeeds only if everyone uses it faithfully. Once one person stops updating his or her schedule, the system breaks down.

As each of the products reviewed here has both a DOS and a Windows interface, we had intended to rank each version separately. But because the feature sets for DOS and Windows tended to be virtually identical, we decided to give each product a single score for each of the three primary tasks involved in successful workgroup scheduling.

People scheduling reflects a program's ability to maintain personal and group calendars and to-do lists. When installing and configuring the program, the administrator should be able to import user names automatically from another source, such as the network Bindery or e-mail post office. The program should also allow for a master calendar where company-wide events such as holidays are posted. The program should also allow for public groups set up by the administrator and private groups created by individuals.

From the user's perspective, it should be easy to set up one-time and recurring meetings. The software should notify you of schedule changes (additions, modifications, deletions) while you are in other applications. You should then be able to re-

SUITABILITY TO TASK				
Product Name				
	POOR	FAIR	GOOD	EXCELLENT
People scheduling	☒	☐	☐	☐
Resource scheduling	☒	☒	☐	☐
Remote scheduling	☒	☒	☒	☐
Remote scheduling	☒	☒	☒	☒

spond to meeting requests, and alarms should warn you of approaching events.

Resource scheduling indicates a package's prowess at managing places and things. The program should recognize the inherent differences between resources and individuals, and adding resources should not decrease the number of users who can access the system under the licensing agreement. The program should allow resources to be pooled, and it should allow for an administrator for each resource.

Remote scheduling concerns the ways users can access their calendars away from the network. Three major subtasks make up this category. First, the program should be able to print schedules in a compact, easy-to-read manner, preferably in formats that are compatible with popular organizers. Second, the program should be able to exchange schedule information with a standalone application. You should be able to reconcile the standalone and network calendars at the office and on the road. Finally, for the most up-to-date scheduling, the program should allow remote dial-in access to the calendar.

commission temporarily, as for equipment repair.

While our portability testing was limited to trying out all the printing capabilities of our products, including the ability to print to personal organizer-type books, we noted such extras as standalone versions (for laptop use), dial-up communications links, and interfaces with hand-held devices such as the Hewlett-Packard LX95 or the Sharp Wizard.

THE 100 PERCENT SOLUTION

As you look over the choices, keep in mind a vital guiding principle: For group scheduling to work, you need 100 percent participation from the members of the group. Unless every individual faithfully blocks out their personal appointments on the system, there is no reality check on the ensuing havoc when someone books time on another person's calendar. Also, there's no room to use "personal favorites" when it comes to scheduling software. Individuals must be willing to give up some of their individuality for the good of the team.

No one program today automates all the functions we'd like to see automated, but each automates at least some important features. At the very least, a program should check for conflicts and provide some way to resolve them easily. CaLANdar, for example, can search through schedules to suggest a meeting time, and it will notify you of conflicts if you enter a time without its help. OnTime will notify you of new messages, meetings, and to-do items each time you start the program.

Resources constitute another important scheduling issue. Some programs treat resources like people, with a separate schedule for each and the need to check each schedule for conflicts. Much better is resource pooling, as you'll find in CaLANdar, for example. If you have five overhead projectors, you don't really care which one you use. With pooling, you can group similar resources, and the program will automatically assign to you the first available resource in the group.

Another key need is an RSVP feature



EDITORS' CHOICE

• CaLANdar for Windows and DOS

Gazing into our crystal ball, we see workgroup scheduling software a year or two down the line as looking drastically different from how it looks today. Chances are it will not be a standalone application, but one of several plug-in modules that piggyback

onto a multifunction, e-mail-based superapplication, reaching across networks and platforms to provide schedule coordination to workers throughout the enterprise.

This compelling vision should not, however, blind us to the usefulness of what's available today. Our Editors' Choice, CaLANdar for Windows and DOS, can get the job done in the here and now. CaLANdar intelligently implements most of the features a scheduling package needs, and does so in such a way that users will want to use it. That's critical for this type of product, where 100 percent participation of the user base is the foundation for the system's success.

Explicitly, CaLANdar handles automatic meeting scheduling (and re-scheduling), and communications around these events, smoothly and painlessly. It recognizes the inherent differences between physical resources and users, correctly pooling

the former. It provides appointment reminders via a TSR that pops up in any application, handles access rights intelligently, and provides at least the beginnings of the kind of portability that we will doubtless come to expect in the future. That means single-user software for laptop use and/or links to hand-held computers (CaLANdar supports the Sharp Wizard and offers an extra-cost single-user module), and the ability to reconcile schedule information remotely over phone lines (CaLANdar accomplishes this by means of another extra-cost software option).

Windows-only shops may want to look at Above & Beyond for Windows (see the sidebar "Workgroup Scheduling: The Integrated Approach"), which offers a unique "dynamic" drag-and-drop approach to time scheduling and a slick, easy-to-use meeting maker. It gives us a good taste of what a GUI can bring to the party.

for meeting requests. Users should not be able to schedule others' time for meetings without confirmation. Meeting requests should show *who* is setting up the meeting; the answer to your boss's request may be different than the answer to your assistant's. They should also let you attach a note, such as an agenda, so people can prepare for the meeting.

FEATURE WATCH

Look for features that let you easily replicate an event—such as a meeting every Tuesday morning for three months—or

change it. Look also for the ability to create and use named subgroups, so you can schedule an entire group at once.

Security and access control make up another area of workgroup scheduling that demands flexibility. OnTime, for example, offers five security levels that you can assign to other users in order to confer different levels of access to your schedule. Without control over access, most users will keep their private scheduling information off the system. In certain situations, you may want to make sure that specific people have complete access to your data, even while you're keeping other people out. You may, for example, want your assistant to have full access to your information so he or she

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Workgroup Scheduling

can modify your schedule for you.

Consider also the to-do list, which should have priority settings and a carry-forward feature so that items keep showing up on the list each day until you have checked them off as completed. And don't forget administrative issues. In particular, note how users get set up on the system. Ideally, the program should pull setup information from the Bindery or your e-mail system. If you have to enter users for the group scheduler separately, you have a guaranteed administrative headache.

STAY TUNED...

Be aware that none of the reviewed programs are as easy to use as they should be. The goal is to combine a common, comfortable interface that people already know how to use (such as a screen that looks and works like a desktop calendar) with maximum automation and device independence. Ideally, for example, you should be able to maintain your schedule on a portable system, then plug into your network (or call in by modem) and have the software automatically and invisibly update your schedule in both directions, flagging any conflicts for your attention. The first real steps in that direction may start showing up shortly, in the next versions of some of these programs, but you won't find them in this roundup. Even now, however, some programs, such as CaLANDar, will let you maintain your schedule on a palmtop portable system and let you plug into your network and give manual commands to coordinate the schedule.

THE MAIL CONNECTION

In the long run, workgroup scheduling software should be tied closely to e-mail as a plug-in module that shares the same addresses and routing schemes for information exchange. If the underlying mail engine is proprietary, then the gateway support must be good. Microsoft Corp.'s Schedule +, which relies on the MAPI

(Messaging Applications Programming Interface) transport engine, and the as-yet-unreleased WordPerfect Office 4.0 both have a number of gateways to connect with other e-mail systems.

Scheduling, then, becomes almost an extension of e-mail, and it becomes another element in workgroup computing. For now, your choice of a scheduler may be dictated by your specific needs. A sales staff, for example, may prefer a scheduler that's tightly integrated with a contact manager, while managers may prefer one that's tied to project management software. Yet if they work together, it's important that the two groups can exchange scheduling information with each other.

You'll have to wait for this kind of interchangeability. Currently, the two most likely candidates for future effective interchange standards are OCE (Open Collaboration Environment), used on the Macintosh, and Microsoft's MAPI.

There are others, but only MAPI and OCE provide enough detail to let different scheduler programs actually move information between each other's schedule databases.

Also be sure that the vendor is committed to supporting the Holy Grail of networking: multipatform, multiprotocol interoperability. In

this context, we applaud WordPerfect Corp. for its upcoming WordPerfect Office 4.0, which will be released with DOS, Windows, and Macintosh versions, soon to be followed by versions for OS/2, Unix, and VAX/VMS.

Finally, it's worth noting that the much-heralded groupware—applications for working groups—is still a nebulous concept. But in the field of maintaining and coordinating multiple schedules, we have one of the first tangible manifestations of groupware: a practical group tool that goes well beyond the benefits of personal schedulers. As scheduling programs for the PC continue to develop, they will help define what *groupware* eventually means.

*As scheduling
programs for the
PC continue
to develop, they will
help define
what groupware
eventually means.*

Microsystems Software Inc.

CaLANDar for Windows and DOS

BY STEVE RIGNEY

CaLANDar for Windows and DOS 2.10m, from Microsystems Software, provides excellent scheduling capabilities without a built-in e-mail system. You can



run it on its own or integrate it with many of the popular e-mail packages. This powerful and flexible program (also available as a DOS-only package) is priced at \$595

for a ten-user LAN package and \$795 for a ten-user WAN package.

The DOS and Windows versions share near-identical functionality and feature easy-to-use menu structures for creating, moving, and deleting personal, unique, or recurring appointments. Despite a few minor problems (the DOS version forces users to toggle between windows with the Tab key; the Windows interface is nearly overwhelmed with cryptic icons and a frustratingly limited ability to issue commands from the keyboard) CaLANDar stands as an intuitive group scheduling tool.

PENCIL ME IN

You can view appointments in several different ways using CaLANDar under DOS and Windows. By selecting Personal Views from the main menu, you can view your personal schedule by day, week, or month. The Group Appointments view shows busy and available time for a group or a resource. An associ-

SUITABILITY TO TASK				
CaLANDar for Windows and DOS				
	PEOPLE	RESOURCES	GROUPS	EXT. INT.
People scheduling	●	●	●	○
Resource scheduling	●	●	●	●
Remote scheduling	●	●	●	○

ated Gantt-style chart graphically depicts who is available when. It also includes a description of what each person is doing during busy times, providing that you have access rights to that information.

WHICH PC?

How Much Speed Do I Need?

How Much Storage?

Why Would I Want Local Bus?

Why's An SVGA Monitor
Better Than A VGA Monitor?

What's the Ideal Configuration
to Run Windows?

Do I Really Need a
Tape Backup?

What's the Most Efficient
System for Word Processing?

What System Do I Need
To Run My Network?

What's the Best Monitor
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1. Which best describes how you use your computer?

- ☐ Family/Household
- ☐ Professionally working at home
- ☐ Commercial/Business

2. Number of PC's installed at this site _____

3. Type of equipment acquisition planned in the next 12 months _____

4. Are you planning to make a buying decision in the next 90 days? _____

5. Number of office workers _____



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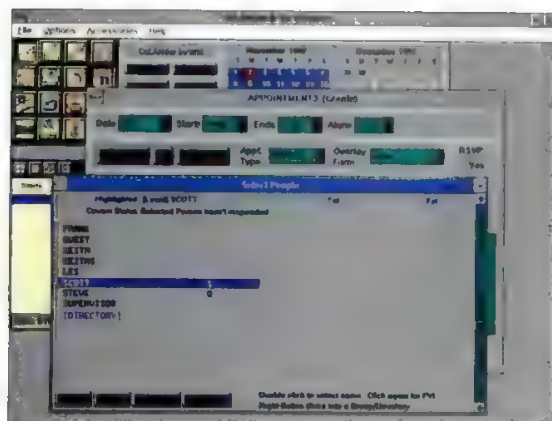
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Workgroup Scheduling



When creating an appointment using CaLAndar under Windows, you select attendees by clicking the People button in the Create Appointments menu.

CaLAndar makes finding an available time for a workgroup meeting easy by automatically searching for conflicts and providing a Find and Suggest Times option from the main menu to help you select the best time for a group appointment.

After you schedule a meeting, you can request RSVPs—for everyone or for specific individuals. You can also set personal or group alarms for the scheduled meeting. If a previously set meeting has to be rescheduled, CaLAndar automatically searches for and highlights the next available time slot. If the new time is not acceptable, you can instruct CaLAndar to continue the search.

CaLAndar aptly recognizes the in-

herent differences between scheduling people and scheduling resources. For example, a room cannot reconcile its own schedule, so CaLAndar makes it impossible for users to schedule a conflict for a resource. It also lets administrators create resource pools that contain resources (such as rooms and overhead projectors) with similar characteristics.

TASK FORCE

Creating and using to-do lists is easy in CaLAndar. To create a task in either the DOS or the Windows version, just select

Tasks from the main menu. A blank window appears asking you for the due date and the priority (a number between one and nine) and whether you want to repeat the task. After you have filled in these items, CaLAndar moves you to the description window, where you can choose to make your task private and assign another person or persons to the task.

It's easy to create reports under both the DOS and Windows CaLAndar interfaces. You can generate calendars in formats that fit Calendar Creator Plus, Daytimer, and trifold pocket calendars. Available reports include those for your organizer, weekly planner, completed tasks, and group reports.

To remind you of meetings when you're not running CaLAndar, Microsystems includes CALTSR, an 8K TSR that pops up in any application to remind you of upcoming meetings.

While CaLAndar doesn't automatically provide remote access to group scheduling, two add-on accessories, CAL Remote and Satellite, help make the task easier. Satellite is a single-user copy of CaLAndar, and CAL Remote offers a remote telecommunication connection to the home CaLAndar office and database. Two other accessories, CALaWAY, an electronic message center, and CALoDEX, an electronic Rolodex, are bundled with the Windows/DOS package. CaLAndar also has built-in support for the Sharp Wizard.

SETUP MATTERS

Networkwide administration must be performed through the DOS version of CaLAndar. Administrators can use this platform to add users or import user names from the NetWare Bindery manually.

User-to-user access rights are controlled by the individual. The spectrum of rights runs from allowing others to change appointments on your calendar to limiting access to the point of denying

*CaLAndar is the
only product
in this review
with built-in
support for the
Sharp Wizard.*

even a top-level view, so that other users can see only free and busy time blocked out.

Only the system administrator can set up public groups (up to 40), but each user has the ability to create up to 20 temporary or permanent personal and resource groups. You create groups by choosing from among People Group, Wide-Area Group, and Resource Group. After you select the type of group, CaLAndar offers a complete list of system users, so that you can choose who to put into the group.

In sum, CaLAndar is a powerful and



CaLAndar's Group Appointment Graph under DOS gives you a graphic depiction of scheduled appointment times for you and others.

PC FACT FILE

CaLAndar for Windows and DOS, Version 2.10m

Microsystems Software Inc., 600 Worcester Rd., Framingham, MA 01701; 508-879-9000; fax, 508-626-8515

List price: 10-user LAN, \$595; 50-user LAN, \$1,095, 10-user WAN, \$795, 50-user WAN, \$1,495.

Requires: Server: 2MB hard disk space plus 1MB per user. Workstation: 394K RAM (TSR requires 9K RAM), 1MB hard disk space, DOS 3.0 or later, Microsoft Windows 3.0 or later for Windows workstation

In short: CaLAndar for Windows and DOS, Version 2.10m, provides every tool imaginable for keeping individual and group schedules in order. With a built-in DOS and Windows interface, CaLAndar is extremely user-friendly.

ON READER SERVICE CARD

The *Evolution* Of P



1984

The Luggables

- 35 pounds
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- Monochrome display
- \$4000 to \$5000



1987

The Laptops

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The HandBook was named one of the year's "Best of What's New" products by Popular Science magazine and received BYTE magazine's Award of Distinction.



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605-232-2000 • Fax 605-232-2023

► **S U M M A R Y O F F E A T U R E S**

Workgroup Scheduling Software

Products listed in alphabetical order



☒ = YES ☐ = NO

	CaLANdar for Windows and DOS	Futurus Team DOS/Windows Combo	Network Scheduler 3 for DOS and Windows	OnTime for Windows/DOS
List price	\$595	\$495	\$395	\$534
Number of users	10	5	5	5

General Features

Uses same database for DOS and Windows	☒	☒	☒	☒
Compatible with palmtops	☒	☐	☐	☐
Password security	☒	☒	☒	☒
Encrypted user-ID files	☒	☐	☐	☐
Real-time "chat" capability	☒	☒	☐	☐
Phone message center	☒	☒	☐	☐
Mouse support	☒ (Windows only)	☒	☒	☒
On-line help	☒	☒	☒	☒
Context-sensitive help	☒ (DOS only)	☒	☐	☒

Individual Calendars

User can view calendar graphically by day, week, and month	☒	☒	☒	☒
List view	☒	☒	☒	☒
User can schedule appointments	☒	☒	☒	☒
User can schedule private appointments	☒	☒	☒	☒
User can attach notes to appointments	☒	☒	☒	☒
User can schedule recurring events	☒	☒	☒	☒
User can find and display free time	☒	☒	☒	☒
Automatic conflict checking	☒	☒	☒	☒
Reminders	☒	☒	☒	☒
Audible alarms	☒	☒	☒	☒
Alarm sounds within other applications	☒	☒	☒	☒

Task Management

User can schedule tasks in a to-do list	☒	☒	☒	☒
User can attach notes to tasks	☒	☒	☒	☒
User can sort tasks by due date	☒	☒	☒	☐
User can sort tasks by priority	☒	☒	☒	☒
User can sort tasks by category	☐	☒	☒	☒
User can move or copy tasks by retyping	☒	☐	☒	☒
User can move or copy tasks by drag-and-drop	☐	☐	☐	☐
Carries uncompleted tasks forward	☒	☒	☒	☒

Group Scheduling

Maintains group and individual calendar databases	☒	☒	☒	☒
User can grant viewing rights to a personal calendar	☒	☒	☒	☒
User can grant read/write rights	☒	☒	☒	☒
Administrator can grant viewing rights to individual calendars	☐	☒	☒	☒

CONTINUES

SOFTWARE
Workgroup Scheduling

► **S U M M A R Y O F F E A T U R E S**

Products listed in alphabetical order

■ = YES □ = NO



	CaLAnDar for Windows and DOS	Futurus Team DOS/Windows Combo	Network Scheduler 3 for DOS and Windows	OnTime for Windows/DOS
Group Scheduling (continued)				
Administrator can grant read/write rights	□	■	■	■
User can maintain customized address groups	■	■	■	■
User can customize work schedules by person and by working days	■	■	■	■
Graphically displays free and busy times	■	■	■	■
Automatically finds conflict-free meeting times	■	■	■	■
Finds earliest times	■	■	■	□
Finds multiple times	■	■	■	□
Reconciles individual and group schedules	■	■	■	■
Identifies conflicts	■	■	■	■
Can override conflicts	■	□	■	■
User can lengthen or shorten meeting times	■	■	■	■
Automatically invites participants	■	■	■	■
User's assistant can update the schedule	■	■	■	■
Deletes canceled meetings from individual calendars	■	■	■	■
Automatically addresses cancellation notices	■	■	□	□
User can prioritize participants	■	□	□	□
Collects RSVPs	■	■	■	■
User can attach notes to RSVPs	■	□	■	■
Tracks meeting attendance	■	■	■	■
Schedules rooms	■	■	■	□
Schedules equipment	■	■	■	□
Portability				
Offers downloadable calendar	■	■	■	■
Remote reconciliation of individual calendars	■	■	■	■
Remote reconciliation of group calendars	□	■	■	■
Reads schedules from other calendaring systems	■	■	■	■
Reconciles calendars across platforms	■	□	□	□
Output				
Printers supported under DOS	HP DeskJet; HP LaserJet II, IID, IIID, and compatibles	HP LaserJet II series and compatibles	Apple LaserWriter II; Epson FX and LQ series; HP DeskJet; HP LaserJet II and III series and compatibles; IBM Proprinter II and XL24	HP LaserJet II series and compatibles
Printed reports:				
To-do	■	■	■	■
Daily, weekly, and monthly calendars	■	■	■	■
Graphic time-usage	■	□	■	□
Prints calendars for daily planners	■	■ (DOS only)	□	□
Special report paper available	■	□	□	□

ENDS

Workgroup Scheduling

well-designed group scheduler. The absence of e-mail is both a plus and a minus. Those currently using an e-mail program don't have to worry about conflicts. If you don't have electronic mail, however, you might opt for a group scheduling program with the e-mail backbone built-in.

Futurus Corp.

Futurus Team DOS/Windows Combo

BY STEVE RIGNEY

Futurus Corp. weaves a capable e-mail system, workgroup scheduling, and a number of other useful workgroup utilities into their product called Futurus Team. Priced at \$495 for 5 users and \$4,995 for 100 users, Team's scheduling capabilities provide you with all the tools you need to schedule your personal and workgroup meetings and appointments effectively. Version 2.02 includes both DOS and Windows interfaces.

Team is relatively easy to use but not very intuitive. You can complete most basic procedures for scheduling an appointment without consulting the manual. When creating an individual or group appointment or meeting, however, new users might become confused. The DOS interface offers pull-down menus, but after you select Appointment from the menu, you're on your own. Hotkey functions are listed at the bottom of the screen, but they are easy to overlook if you don't know about them.

FUTURE TIME

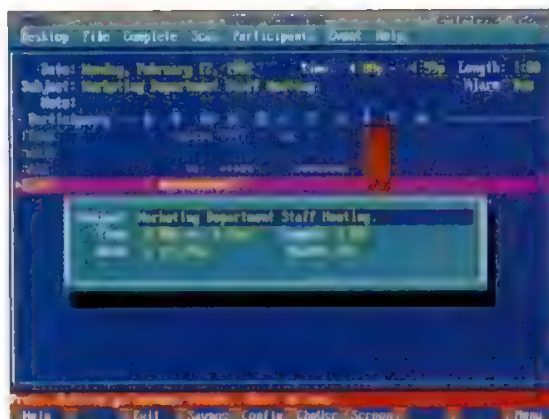
To schedule an appointment, you must choose either the Personal Schedule or Group Schedule option from the main menu. Once you have selected the type of appointment you wish to create, Team prompts you for the date by posting a monthly calendar. You can choose the appropriate date by using the arrow keys in both the DOS and Windows interfaces or the mouse under Windows.

To select the time of the meeting, you simply scroll be-

tween the desired hours listed on the screen—a process that is faster and easier to do than typing in the date and time. Once you have scheduled an appointment, Team's e-mail program kicks in and sends the potential attendees an invitation for which you can optionally request an RSVP.

When you select Personal or Group Appointments from the main menu in Team, you are presented with the current day as the main window and a monthly calendar in a smaller window. You can display one day at a time or choose to see a two-week period at a single glance. You would have to figure out for yourself that it is a two-week schedule, however. The actual screen just lists 14 days in order. Other scheduling products such as Microsystems Software's CalANdar offer the same views of your schedule, but they do so in a more detailed manner with clearer indications of what you are looking at. Team does provide other good tools for viewing your calendar, however. Color-coded symbols and icons show you the status of an appointment at a glance, so you don't have to take the time to open the appointment for further details.

Team also makes it possible to view another person's calendar to look for free



Once you've arranged a workgroup meeting, Futurus Team's DOS package presents a window depicting the attendees' personal schedules. From here, you view possible meetings conflicts.

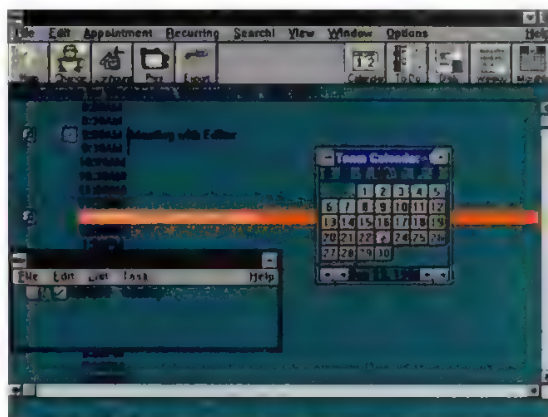
time. As long as you know a user's password, you can select their name, enter the password, and then view or even make changes to the user's calendar of events. Team does not give you the ability to protect certain features of the program, such as to-do lists and personal schedules. If you know another user's password or if he or she doesn't have one, you have total access to that person's data.

GROUP ENDEAVORS

Setting up group meetings is done the same way as setting up personal appointments, except that you select Group Appointments from the main menu. After you have created a group appointment, Team will automatically check each attendee's personal schedule to look for conflicts. If Team finds conflicts, it alerts you, and you can continue to search until a workable time is found. Most of this procedure is automatic, and you can accomplish it in seconds. Team also allows you to prioritize certain attendees and resources, require RSVPs, and set alarms for appointments that remind users of their commitments. You can also edit the date, the time, and the subject of a group appointment without re-creating the appointment.

Team includes a to-do list option for both DOS and Windows that allows you to create, edit, or modify a short description of appointments or errands you need to complete. The to-do list procedure al-

SUITABILITY TO TASK				
Futurus Team DOS/Windows Combo				
	POOR	FAR	GOOD	EXCELLENT
People scheduling	●	●	●	○
Resource scheduling	●	●	○	○
Remote scheduling	●	●	●	○



Futurus Team's Create Appointments screen in Windows is integrated with the graphical calendar featured on the right. Click on any day and the main window changes to that date.

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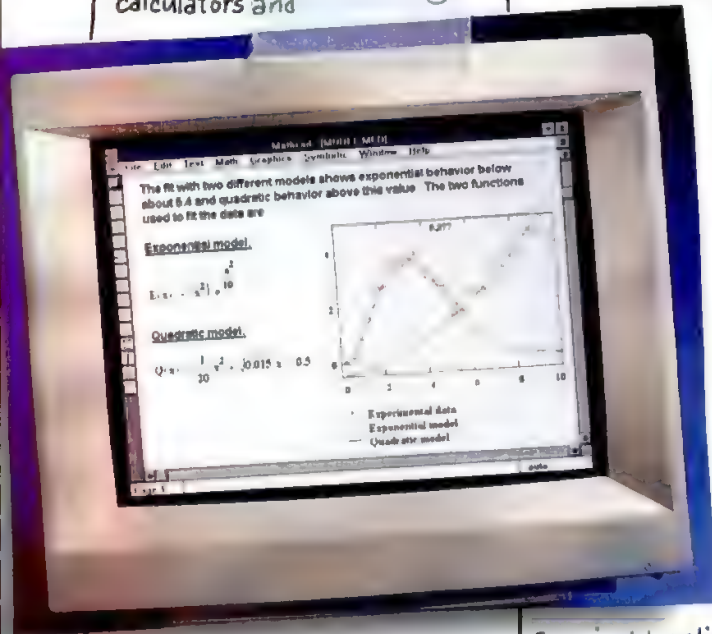
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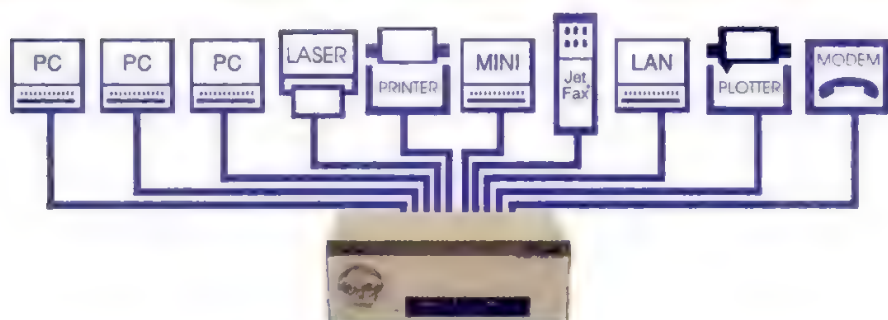
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Workgroup Scheduling

FACT FILE

Futurus Team DOS/Windows Combo, Version 2.02

Futurus Corp., 211 Perimeter Center Pkwy.,
#910, Atlanta, GA 30346; 800-327-8296,
404-392-7979; fax, 404-392-9313

List price: 5 users, \$495; 25 users, \$1,995; 100 users, \$4,995

Requires: Server: 1MB hard disk space Workstation: 640K RAM, no hard disk space, DOS 3.1 or later, Microsoft Windows 3.0 or later for Windows workstation.

In short: Futurus Corp.'s Futurus Team DOS/Windows Combo, Version 2.02, provides the total solution for workgroup interactivity and scheduling. Complete with e-mail and scheduling, this program can help a user begin to get everyone in the company organized and on-line.



allows you to open an existing list, rename a list, or print a to-do list. You can instruct Team to check for overdue to-do list tasks and set an alarm to go off before the time a task is due.

Team does not offer a huge selection of output reports. Your choices are limited to reports that are organized by days, months, weeks, and ranges for all three.

TEAM WINDOW

The Windows implementation of Team is effective for users but cumbersome for system administrators. Team runs as a 10K TSR that you can pop up at any time, whether you're running Windows or DOS. In fact, you can't run the Windows version of Team without starting the DOS TSR.

Furthermore, in order to set up and maintain group resources and user lists, you must have global privileges. Unfortunately, the global user cannot maintain any groupwide users or resources under Windows. On the other hand, the Windows interface is easier to use if you like using a mouse and icons.

The installation and setup of the program is one of the easiest around. After you install the program, you can set up users and groups by typing in each name or by extracting information from the NetWare Bindery and/or Artisoft's LANtastic user list. Team works across a wide range of network operating systems.

Futurus Team is designed as an all-in-one tool. As a workgroup scheduling product, the program provides all the functionality you need to manage day-to-day tasks and appointments effectively. The DOS and Microsoft Windows versions offer the same functionality, thus allowing even the pickiest people to work with their favorite interface. Futurus Team is ideal for smaller organizations that need good workgroup scheduling as well as e-mail (see "E-Mail Systems: Can They Keep Their Customers Satisfied?" in the October 27, 1992, issue of *PC Magazine*) and other utilities.

PowerCore Inc.

Network Scheduler 3 for DOS and Windows

BY STEVEN C. M. CHEN

PowerCore's Network Scheduler 3 for DOS and Windows, Version 1.0 (\$395 for five users), is a powerful workgroup scheduling package for any office that wants



to improve communication among its employees. Network Scheduler 3's real strength is as a tool for efficient management, once you learn the ropes.

The documentation for Network Scheduler 3 (NS3) needs some work. Although they do a good job of covering the basics, the manuals lack details on some of the more advanced features. First-time users may well find the combined DOS/Windows manual confusing. Help is available but is not context-sensitive.

Despite this, scheduling an event with NS3 is easy. Why? Partly because NS3 uses a consistent interface across platforms. You can access functions using a mouse, pull-down menus, or hotkeys. It's the same for both the DOS and Windows versions, even down to the Alt-F4 to exit. The Windows version, however, offers icons for some frequently used functions. The other reason is the veritable scheduling hub NS3

calls its Entry Pad. The Entry Pad is a dialog box where users schedule a meeting, add participants and resources, set a location for the meeting, state a reason for the meeting, include any comments, make changes, and respond to RSVP re-

SUITABILITY TO TASK

Network Scheduler 3 for DOS and Windows

	POOR	FAIR	GOOD	EXCELLENT
People scheduling	●	●	●	○
Resource scheduling	●	●	●	○
Remote scheduling	●	●	●	○

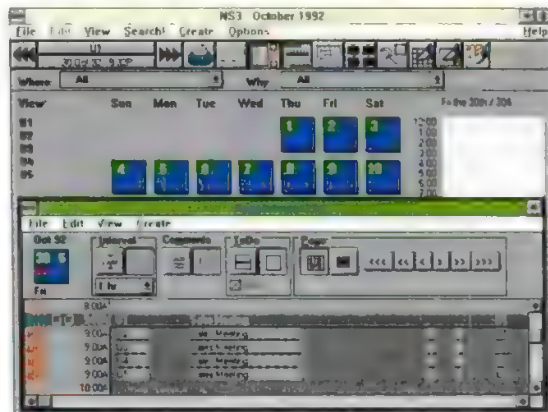
quests.

By default, NS3 displays the current month's calendar on start-up, though it can be configured to display up to five additional windows as well—daily (an appointment list), weekly, graph (a monthly bar graph that displays appointments and meetings), six-month (four-month in the DOS version), and new/unconfirmed events.

TAKING ON THE TASKS

Having problems finishing all your tasks? NS3's to-do list will make you feel even guiltier as it grows and grows and follows you from window to window. The list indicates when each item was first added; for example, -7 means a task is from a week ago. Five different priorities can be set, and you can check off the Done box for each completed task.

Security in NS3 is pretty rudimentary: Rights to view one's calendar are either denied or granted, with denied as the default. This can be changed either by users



The Microsoft Windows version of PowerCore's Network Scheduler 3 offers users the option to open and access multiple windows easily.

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 - 3½" format available from manufacturer by request. Call us for details.
- All software is not copy-protected, unless indicated otherwise by (CP).

The four-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

We carry only the latest versions of products. Version numbers are current at press time. Products listed here in red are Microsoft Windows Applications.

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Please call for criteria to qualify to trade up for these popular products. Policies may vary depending on vendor.

Alpha Software	
9724	□Alpha FOUR 2.1 Competitive Upgrade \$89.
Approach Software	
3830	■Approach for Windows Competitive Upgrade 139.
Borland International	
3684	■Quattro Pro 1.0 Windows Competitive Upgrd. 80.
Claris Corp.	
5228	■FileMaker Pro Competitive Upgrade 95.
Corel Systems	
4560	□CorelDRAW! 3.0 Competitive Upgrade 225
Expervision	
8403	■TypeReader 1.01 Competitive Upgrade... 149
Gold Disk	
5412	□Gold Disk Professional Draw Comp. Upgrd.. 115.
Microsoft	
5693	□Excel 4.0 Competitive Upgrade..... 125.
8353	□PowerPoint 3.0 Competitive Upgrade 125.
3881	□Word for Windows 2.0A Competitive Upgrade 125.

SOFTWARE

AddStor	
8807	■SuperStor Pro 1.0..... 85.
Adobe Systems	
7547	■Adobe Type Manager 2.5 for Windows 59.
6591	□Adobe Illustrator 4.0 for Windows 389.
7940	□Adobe Type Set Value Pack (30 fonts) 39
<i>(Entire Adobe Type Library available.)</i>	
Aldus	
1332	□PageMaker 4.0 for Windows 499.
7744	□Publishing Showcase 669.
Alpha Software	
5104	■Alpha FOUR 2.0 (Incl. Free 2 LAN Pack)..... 329.
Altays Corporation	
8675	Fontographer for Windows (3½" only)..... 259.
Application Techniques	
8337	■WinDings 1.0 for Windows 49.
1214	■Pizazz Plus 3.0..... 79.
Approach Software	
6598	■Approach 2.0 for Windows 259.
Area Software	
6030	■FontMonger 1.06 for Windows 89.
Artisoft	
2455	Lantastic AE-2 EtherNet Starter Kit 4.1 469.
9775	Lantastic AE-2 Starter Kit for Windows 499.
2452	AE-2 EtherNet Adapter Card..... 199.
Atech Software	
4797	■AllType 2.0 (universal typeface converter)..... 45.
Automap	
2729	■Automap USA for DOS.. 55. 8569 Windows. 55.
Avery Dennison	
6006	■Label Pro 1.6 (Laser)..... 49.
Banner Blue Software	
2088	■Org Plus 1.0 for Windows..... 125.
Berkeley Systems	
9885	■After Dark 2.0 for Windows 29.
8648	Star Trek: The Screen Saver (3½" only)..... 34.

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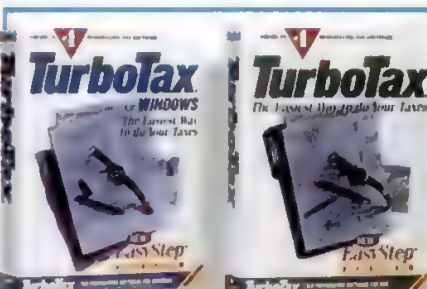
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9553	LTE Lite/25c with 120 MB.....	3589.
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	Bitstream LI1 Bits (3½" only)..... ea. 19.
8040	■FaceLift 2.0 for WordPerfect 5.0/5.1 69.
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9635	□Object Vision 2.1 99.
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5900	■PC USA 2.0..... 29. 5902 ■PC Globe 5.0.... 39.
8855	□Print Shop Deluxe 1.0 45.
Caere	
4130	■Faxmaster 1.0 159.
8933	■OmniPage Professional 2.1..... 629.
Central Point	
8114	■Backup 7.1.... 89. 5039 □PC Tools 8.0.... 125.
ChipSoft	
1663	■Turbo Tax Personal 1040 for DOS..... 49.
3517	■Turbo Tax Personal 1040 for Windows..... 49.
6221	■Turbo Tax/Quicken Bundle 10.0/6.0 Headstart 59.
3080	■Turbo Tax Windows/Quicken Bundle 10.0/2.0 59.
	■Turbo Tax State Packages for DOS..... ea. 39.
Claris Corp.	
5257	■FileMaker Pro 2.0 for Windows 288.
CompuServe	
7546	■DOS Membership Kit 2.0..... 25.
Contact Software	
1625	■Act! 2.1 229.
Corel Systems	
5506	□CorelDRAW! 3.0 395.
Data Storm	
4798	■PROCOMM PLUS 2.01.. 69. 6918 Windows. 99.
DCA/Crosstalk	
5611	■Crosstalk 2.0 for Windows 119
Deirina Technology	
2446	■WinFax Pro 3.0 49. 5974 ■DOSFax PRO.. 79.
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5172	■FreezeFrame 1.0 for Windows 62.
8705	□DeltaGraph Professional 1.0 for Windows 339.
Expervision	
7494	■TypeReader 1.01 Windows (\$100 rebate) 499.
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7725	■Direct Access 5.1 64.
3950	■Fastback Plus.... 119. 6431 ■ Windows 119.
Fractal Design	
7822	■Sketcher 1.0 for Windows 95
Gibson Research	
9832	■SpinRite II 2.0..... 59.
Hewlett-Packard	
8731	■Dashboard 1.0 for Windows 45.
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7303	□OS/2 2.0 Upgrade from DOS 99.
Insel Systems	
7298	■HiJaak 2.1.... 139. 3820 ■for Windows ... 139.
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2426	■Quicken 5.0.... 45. 5596 ■for Windows..... 45.
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6882	■PrintCache 3.0..... 99.
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5417	□1-2-3 3.1 Plus..... 399.
5653	□1-2-3 2.4..... 335. 1852 □Upgrade 99.
2755	□1-2-3 1.1 for Windows 335 3424 □Upgrd 99.
5799	■Ami Pro 3.0 249. 1847 Competitive Upgrade 99
3523	□Freelance 2.0 Windows 349. 4983 □Upgrd 99.
5981	□SmartSuite 469.

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2798	■Managing Your Money 9.0	32.
4603	■Tax Cut 1992 (Headstart Edition).....	45.
3885	■Tax Cut 1992 Windows (Headstart Edition)	45.
	■State Tax Packages	ea. 32.
4880	□Accounting Works 3.0	119.
	Microcom	
6234	■CarbonCopy Plus 6.1.. 129. 6958 Upgrade 45.	
4410	■CarbonCopy Plus 1.0 for Windows	129.
	Micrografix	
3627	□Windows Draw! 3.0	99.
	MicroLogic Software	
5350	■TrueType 1.0 for DOS	49.
8579	■MoreFonts 3.0	75.
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8355	□Access 1.0 for Windows	intro. price 95.
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7388	■Project 3.0 for Windows	445.
8137	□Office 3.0 for Windows	479.
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8659	■Cursor Deluxe 1.0	27.
	Noto Press	
2982	■WillMaker 4.0	35.
	Norton-Lambert	
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2413	■WinSpeed 1.0 (Windows accelerator)	55.



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	□Accounting 5.0 for Windows.....	79.
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	Laptop Ultravision 2.1 (3 1/2" only).....	59.
4395	Polaris Software	
	□PackRat 4.1.....	249.
7539	Qualitas	
	□386MAX 6.02.....	59.
3221	Quarterdeck	
	□Expanded Memory Manager 386 6.0.....	59.
4586	□DESQview 386 2.4.....	129.
6572	Reality Technologies	
	□WealthBuilder 3.0 (incl. Smart Investor).....	95.
4396	Reference Software	
	□Grammatik V.... 55. 7483 □for Windows....	55.
5426	Shapeware	
	□Visio 1.0 for Windows.....	199.
5883	Sofnet	
	FaxWorks 2.5 (Windows & DOS) (3 1/4" only).....	65.
5147	Software Marketing Corporation	
	□Orbits 1.0.... 39. 5145 □Bodyworks 1.0....	49.
3482	Software Publishing	
	□Harvard Graphics 399. 4403 □for Windows 369.	
4160	Software Ventures	
	□MicroPhone Pro 1.0 for Windows.....	135.
1409	Stac Electronics	
	□Stacker 3.0.....	95.
3784	Symantec	
	□The Norton Backup 2.0 for Windows.....	99.
3146	□The Norton Utilities 6.01.....	115.
2359	□The Norton Desktop 2.0 for Windows.....	115.
8378	□Norton PC Anywhere 4.5.....	119.
9847	Teleware	
	M Y O B. 3.0 for Windows (3 1/4" only).....	109.
5696	TIMESLIPS	
	□Timeslips Release 5.....	189.
7420	Touchstone Software	
	□Check It Plus 3.0.....	85.
4407	Traveling Software	
	□LapLink Pro 4.0.....	99.
3804	WordPerfect Corporation	
	□WordPerfect... 269. 3494 □for Windows....	279.
8328	XTree	
	□XTree 1.0 for Windows 65. 6161 □Gold 2.5 95.	

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3340	Broderbund ... CP	
	□Kid Pix 1.0... 35. 5851 □SimCity from Maxis	29.
4411	□SimEarth 1.0 for Windows from Maxis.....	45.
8653	Interplay	
	□Mario Teaches Typing.....	24.
4692	□Dvorak on Typing for Windows.....	29.
8492	Microsoft	
	□Golf for Windows.....	45.
4534	Software Toolworks	
	□Mavis Beacon Teaches Typing 2.0 (CP).....	29.
5032	□Miracle Piano Teacher (includes keyboard).....	325.
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	□Aladdin Print Kit 1.0.....	15.
9984	□The Animation Studio 1.0.....	72.

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3453	3 Com ... lifetime (conditional)	
	EtherLink II/16..... 159. 3469 II/16 TP.....	169.
7106	American Power ... 2 years	
	Smart UPS 400.... 339. 7105 UPS 600.....	439.
3819	Back-UPS 250.... 115. 3858 UPS 400.....	179.
7107	Back-UPS 450.... 215. 3823 UPS 600.....	295.
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8463	ATI Technologies ... 5 years	
	VGA Wonder XL24 (with 1 MB).....	149.
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3871	Graphics Ultra Pro (with 2 MB).....	519.
7150	Boca Research ... 5 years	
	BOCARAM/AT PLUS (2 MB).....	208.
7139	(4 MB)..... 319. 7138 (8 MB).....	539.
6996	I/O Board for AT... 49. 6999 for PS/2.....	89.
8380	BasicVGA..... 49. 8381 SuperVGA.....	115.



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9051 PM14400FX with WinFaxPro..... 379.
9052 2400EFXSA with WinFaxPro..... 199.
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9050 PM2400FSA with WinFaxPro..... 139.
9040 PM2400F with WinFaxPro..... 119.

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7893	BJ-10ex Printer (4.6 lb.).....	299.
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7897	BubbleJet Ink Cartridge (BJ-10ex).....	23.
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7667	MVP961F FaxModem Value Pack.....	195.
8689	386SX-33 MHz Motherboard OK.....	275.
	Chips & Technologies ... lifetime	
6137	SuperMath 387DX-25.....	55.
6138	387DX-33..... 65. 8388 387SX-33.....	84.
	Compaq Computer ... 3 years	
9548	ProLinea 3/25c with 84 MB, Windows (monitor not included).....	939.
9549	ProLinea 4/25c with 240 MB, Windows (monitor not included).....	1399.
9554	LTE Lite/25c with 84 MB.....	3289.
9553	LTE Lite/25c with 120 MB.....	3589.
9552	Contura 3/25 with 120 MB, Windows.....	2059.
9551	Contura 3/25c with 120 MB, Windows.....	2629.
9550	Contura 3/25c with 84 MB, Windows.....	2349.
10300	CoStar ... 1 year	
	Address Express.....	689.
	COVOX ... 1 year	
5543	Sound Master II.....	145.
	Creative Labs ... 1 year	
8578	Sound Blaster... 99. 2336 Sound Blaster Pro	188.
5770	Sound Blaster 16.....	229.
	Curtis ... lifetime	
1708	Ruby-Plus SPF-2+.....	59.
7358	Command Center SPF-4.....	79.
	Cyril Corporation ... 5 years	
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9875	FasMath 83D87-25 or 9876 83D87-33.....	es. 89.
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8333	SpeedStar 24X Graphics Accelerator.....	175.
6945	Stealth Hi-Color.....	239.
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2358	LQ-570 (80 col., 252 cps).....	289.
2361	LQ-870 (80 col., 330 cps).....	489.
2357	LQ-1170 (136 col., 330 cps).....	669.

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	WinTV.....	439.
	Hayes ... 2 years	
9039	Accura 2400 (ext.).... 85. 9033 (internal).....	79.
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8187	OPTIMA 24+FAH96.....	159.
7395	OPTIMA 144+FAH144.....	479.
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6442	LaserJet 4 (with toner).....	1499.
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3864	14.4EX Modem.....	469.
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5994	Modem 4000... 399. 5995 Modem 400E....	449.
5999	□FAXability Plus (software).....	79.
6003	□FAXability Plus OCR (software).....	165.
2994	EtherExpress 16 or 3021 16 TP.....	ea. 129.
	MATH COPROCESSORS	
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5409	80387DX (all 80387DX CPU's).....	85.
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7899	Expert Mouse serial... 99. 7900 bus.....	115.
	Key Tronic ... 3 years	
4518	101 Plus Keyboard.....	99.
4387	Trak 101 Keyboard (with trackball).....	165.

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5637	ProAudio Spectrum 16	199.
7873	Fusion CD 16	499.
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7580	T3144 Internal 14.4 S/R FAX/Modem	529.
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7597	Microsoft Mouse (bus or serial)	85.
2898	Mouse with Windows 3.0 (bus or serial)	149.
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8454	Matador 105 for DOS	95.
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5437	PM2400F Pocket Modem	115.
5429	PM2400EFX SAV.42 bis (external)	145.
5428	PM2400EFX V.42 bis (internal)	139.
5436	PM2400F SA Mini (external)	79.
7934	PM9600SA Modem	289.
1344	PM2400FX96SA (external modem/fax)	99.
9051	PM14400FX with WinFax Pro Bundle	379.
3803	PM14400FX (internal modem/fax)	359.
9234	PM14400FXPPM Fax/Modem	359.
2425	PM14400FXSA (external modem/fax)	399.
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1305	Universal Notebook (computer case)	69.
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6315	Fax Line Manager 203	125.

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8593	TheComplete Communicator Gold	479.
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1166	AMX 2400 Baud External Modem	63.
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4428	FaxModem VFX V.32bis 14,400 baud (external)	259.
7921	Pocket FaxModem	87.

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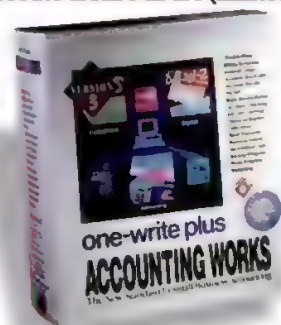
	Colorado Memory Systems ... 1 year	
4194	Jumbo 120 Tape Backup	199.
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1213	Trakker 120 Tape Backup (parallel)	359.
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6343	PC Powered 90 (incl. PC2B & cartridge)	499.
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2530	90 MB Cartridge	149.
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2761	1.44EX MB Ext. (for any parallel port)	239.
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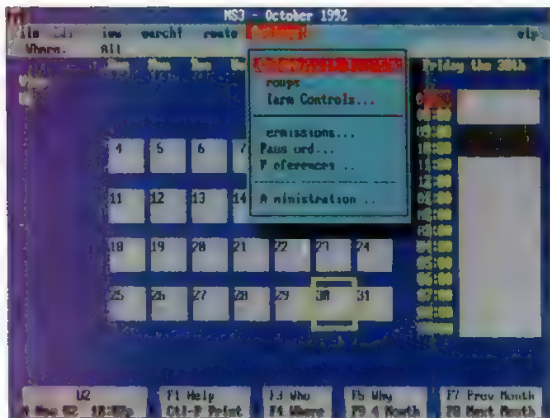


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Workgroup Scheduling



The DOS version of Network Scheduler 3 may lack the pizzazz of the Windows version, but it does offer remarkable similarity in look and feel.

or by the administrator. *Denied* means that other NS3 users can check your calendar for free time and schedule you for appointments, but they cannot see any details. You can also place a lock on individual events with the same result. *Granted* means that others have complete access to your calendar, with the exception of private calendars or resources you create.

NEVER ENOUGH TIME

Having difficulty finding free time for appointments? Don't worry, NS3 will come to your rescue. A search can be set for the desired range of hours and duration and automatically excludes weekends. You select the participants and resources from the View Who/What list. Once a search condition has been met, you can go ahead and schedule the meeting or search for the next available time.

As mentioned, users can easily create nonshareable private groups and resources. Unlike CalANdar, NS3 does differentiate between users and resources. A manager can be assigned to each resource to control its scheduling.

To see meetings newly scheduled by others (and relevant notes), select the New/Unconfirmed Events view. This shows lists of participants and their RSVP status. (There's no RSVP status in the DOS version.) From here, you can go ahead and either confirm or decline a meeting request.

MEETINGS IN MOTION

Rescheduling meetings is a standard practice in any busy office, and NS3's cut-and-paste feature helps you accomplish this quickly. For example, you can cut the original meeting

from 9 A.M. and paste it to 4 P.M.—much faster than manually changing the time or date. All the participants are automatically notified of the changes. You schedule recurring events by selecting the months, weeks, and days. The package generates a list of dates, from which you can delete any that happen to fall on holidays or vacation days.

You can set alarms in NS3—anywhere up to 60 minutes in advance of an event. You can also take your schedule with you in the form of several types of printouts, including monthly, weekly, daily, bar graph, and trifold weekly and daily calendars. NS3 also offers links to the HP 95LX and the Sharp Wizard.

The version of NS3 that we reviewed

contains a few non-lethal bugs. PowerCore is working on an interim maintenance release to fix these. By the time you read this review, Version 1.1 should be announced and on its way to the marketplace. In addition to a new manual, the product will also feature a speedier DOS version.

NS3 databases located on different file servers can communicate via e-mail. A separate \$149 remote-user package

allows access from afar. Support includes Microsoft Mail and MHS-based mail.

MATTERS ADMINISTRATIVE

There are several things the network administrator should be aware of. NS3 permits administration from both DOS and Windows. If you don't have MHS-based e-mail, however, the user names will have to be input manually. At this time, NS3 can't read the NetWare Bindery. To ad-

*The to-do list in
Network Scheduler 3
follows you
from window
to window.*

dress the lack of preentered holidays, you will have to create a master calendar, and each user will have to include it in his or her view.

Overall, PowerCore's Network Scheduler 3 scores high on ease of use and features and offers amazing similarities between DOS and Microsoft Windows versions. The program can definitely handle the scheduling demands of large offices—up to 1,000 users (per file server), 4,000 public resources, and 250,000 entries per month.

Campbell Services Inc.

OnTime for Windows/DOS

BY STEVEN C. M. CHEN

The \$356 (for three users) OnTime for Windows/DOS, Version 1.2, boasts an interface that's so easy to use you'll want to schedule an appointment immediately. Unfortunately, the package does not automatically search for free time, so scheduling meetings in a busy office can be a difficult task. In addition, since OnTime manages resources (meeting rooms and equipment) as users—and the package is sold per user—offices with numerous resources will find it an expensive solution.



FACT FILE

Network Scheduler 3 for DOS and Windows, Version 1.0

PowerCore Inc., One Diversatech Dr.,
Manteno, IL 60950; 800-237-4754,
815-468-3737; fax, 815-468-3867

List price: 5 users, \$395, 25 users, \$1,195

Requires: Server 3MB to 4MB hard disk space plus 512K per user Workstation 460K to 512K RAM, no hard disk space, DOS 3.0 or later, Microsoft Windows 3.0 or later for Windows workstation.

In short: Network Scheduler 3 for DOS and Windows is an easy-to-use, full-featured group scheduling program that offers resource management and the ability to search for free time. The similarity of the DOS and Windows interfaces makes for easy migration between platforms.



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SOFTWARE

Workgroup Scheduling

OnTime defaults to a daily-appointment view and a three-month calendar. Icons are provided for such frequently used commands as add, delete, modify, or reschedule an appointment; view week; and view month.

Scheduling an individual event (called a message) is relatively easy and straightforward, but there are several ways to initiate the process of creating *group* messages: pulling down the Group menu, typing Alt-G, or clicking the Group Add icon if you're in the week view. (Incidentally, the icon changes to reflect the number of user calendars you have selected: a magnifying glass for one user calendar and a cartoon group of people for multiple calendars.)

The next step is actually processing the task or meeting request. This takes place in the Add a Message window, which offers options such as RSVP, Select Attendees, and Add a Memo. But be prepared to wait as OnTime processes your group requests. On our test network, a meeting notice for ten attendees took about 30 seconds to process.

Due to the absence of an automatic search feature, finding free time across multiple calendars requires a lot of human intervention. You will have to look for available times on other users' schedules by including them in the expanded week view—a workable solution for a small office, but time-consuming in a large, busy one. Since multiple events can

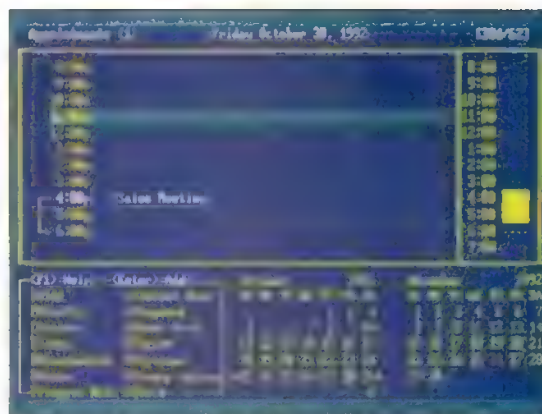
be scheduled at the same time, be prepared to deal with multiple bookings—as your colleagues may give up the searches after a few tries.

POINTS OF VIEW

Since you can see schedule details only in the expanded week view, chances are you'll find yourself switching back and forth between this and the normal week view while attempting to find a perfect meeting time. To move from one day's expanded view to another's, you must return to the normal week view. This takes a

lot of time as OnTime's performance is noticeably sluggish. You can easily wait several seconds for OnTime to respond. On a busy network with a large number of attendees, expect even a longer response time.

To reschedule a meeting, you can use the Reschedule icon, the menu, or the shortcut key (Alt-R), or you can simply drag the meeting into the new time. You will get a conflict notice if a meeting already exists in that time frame. If you need to glance quickly at all the appointments scheduled this week or this month, you'll be disappointed. Both views show free and busy time graphically, but to see the details, you must point the mouse at the time to view a pop-up information display.



Consistency between OnTime's DOS and Windows versions is not a strong point. There is no mouse support in the DOS version, pictured above.

one will be able to see the details.

The notification feature is excellent. Every time you boot up or return to OnTime, a window displays all your new messages. If you can't deal with new messages immediately, a reminder message stays on the screen. Meeting initiators can pop up a window showing the status for all the attendees, including who has read the notice and responded to an RSVP request. You can set an alarm for each appointment or meeting.

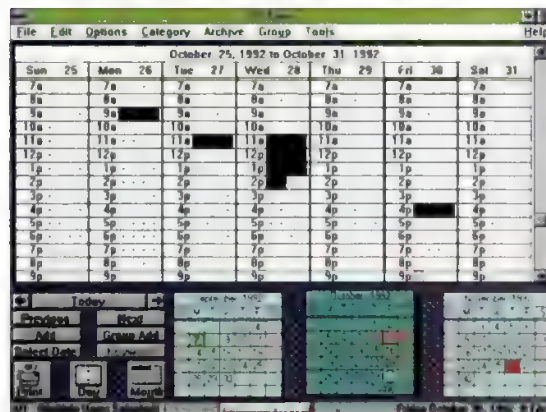
TO-DO OR NOT TO-DO

Looking for a way to break up a long to-do list? OnTime lets you create separate lists for each of your projects. Each task defaults to an automatic rollover but can

SUITABILITY TO TASK

OnTime for Windows/DOS

	POOR	FAIR	GOOD	EXCELLENT
People scheduling	●	●	●	○
Resource scheduling	●	○	○	○
Remote scheduling	●	●	●	○



Under Windows, Campbell Services' OnTime shows a three-month calendar and displays icons for some of the most frequently used functions.

INTERNAL SECURITY

OnTime has extensive security features. Five separate levels can be set by either an administrator or a user. The most secure level, "no access," will remove any user from the scheduling loop entirely. It's like having an unlisted phone number. You may not want to give other users read/write access because they will have the same rights to your calendar as you do—including all the non-appointments. You can mark private events as hidden and no

FACT FILE

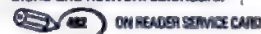
OnTime for Windows/DOS, Version 1.2

Campbell Services Inc., 21700 Northwestern Hwy., #1070, Southfield, MI 48075; 800-345-6747, 313-559-5955; fax, 313-559-1034

List price: 3 users, \$356; 5 users, \$534; 10 users, \$820; 25 users, \$1,770; 100 users, \$4,680.

Requires: Server: 2MB hard disk space plus 60K per user. Workstation: 470K RAM (TSR requires 18K RAM), no hard disk space, DOS 3.0 or later, Microsoft Windows 3.0 or later for Windows workstation.

In short: OnTime for Windows/DOS is an easy-to-use scheduler with a good individual-user interface. Version 1.2 now offers RSVP, archiving, notification by MHS-based e-mail, and reconciliation between standalone and network calendars.



be set for today only. You can set priorities as well. The program has no provision to mark a task as completed; you simply delete it. The Add Note feature, which lets you attach notations to every task, can turn a simple reminder into a detailed account.

No remote-user version is available at this time. If you want to check your schedule while on the road, you have to download it from a standalone version of OnTime and upload it when you return,

*The DOS version
of OnTime offers
all of the
scheduling features
found in the
Windows version.*

using a reconciliation utility. You can, of course, take a printout with you. These include daily, weekly, monthly, trifold, duplex, "all messages," and "all messages through today" reports.

DOS DIFFERENCE

Differences between the DOS and Windows versions of OnTime are numerous, but the DOS version does offer all the scheduling features found in the Windows version. DOS users, however, will see a much different display. Menus are organized and labeled differently, and the mouseability of the Windows version is missing.

The setup process is straightforward. Users' names can be imported from the NetWare Bindery, LANtastic, MHS-based e-mail, or ASCII files. OnTime does come with a preset holiday list, but it can't be changed. An administrator can set aside a spare user's account to create a custom office calendar.

Though OnTime has an intuitive interface, its lack of an automatic search for free time across multiple schedules could be a real drag on group scheduling. Also, OnTime can be an expensive solution for any office that has many resources and is looking for a resource management tool in addition to a scheduler.

WORKGROUP SCHEDULING

Single-Platform Schedulers

BY LANCE ULANOFF

While a multiplatform group scheduler that lets each individual run on their platform of choice is the ideal, the ideal is far from reality. Many installations are DOS-only environments. Others are, for now, content to run a DOS app under Windows, and still others have moved exclusively to graphical environments like Windows. For these users, multiplatform is a nonissue. What follows is a look at three single-platform group scheduling applications.

CA-UPTO DATE

Computer Associates International's (516-342-5224) Windows-only product's color-coded approach to workgroup scheduling makes it the peacock of this bunch. Unfortunately, the rainbow of color-keyed events (including a choice of different colors for the default, and four user-specified categories) sometimes makes for more confusion than clarity. In CA-UpToDate, Version 2.66 (\$149), every user, group, and resource has an Agenda, essentially a color-coded timetable of meetings and appointments. Each Agenda can be viewed separately or, if it's part of a group, in a graphic overlay.

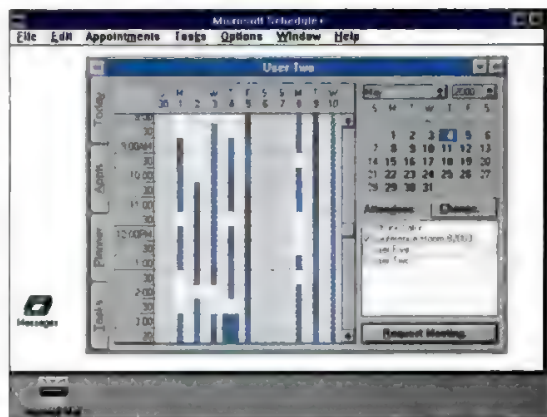
CA-UpToDate does not read the NetWare Bindery. Instead, users are created under the Agenda menu. Multiple users are added in the Multiple Creation box. Groups are made and named in the Group dialog box. Access across the system is set in the administrator's password-protected Access dialog box.

The default screen displays a color-coded Gantt chart, a monthly personal calendar, and a key that identifies what the colors stand for. The calendar and key are optional and can be disabled easily. Users can switch between their own schedules and any number of group schedule views in a separate group sched-

ule window. This screen, too, contains a special color key to explain the chart. One specified color means one person from the group is occupied at a particular time; black means that no one—possibly including a resource—is available.

Because of its contact orientation, CA-UpToDate feels like a contact manager in disguise. The moment you elect to make an appointment, a Choose Contact window appears, containing a list of all users and named groups. By selecting a group, you can request a meeting for all those included.

Computer Associates plans to release a minor upgrade early this year and a major one, possibly in the third quarter, which should add drag-and-drop and DDE (Dynamic Data Exchange) support. But for now, the colorful confusion and the absence of drag-and-drop to



In Microsoft Corp.'s Schedule+, Version 1.0, selecting Multiple Attendees in the Planner allows users to see multiple schedules in an overlay view.

change an existing appointment make CA-UpToDate a somewhat disappointing Windows product.

NETCAL

Chantal Systems' (619-621-2810) DOS-based NetCal, Version 4.8 (\$360 for ten users), has just about the right blend of features to make it an inviting character-based group scheduling package. One plus with NetCal (which can also run as a TSR) is that it can read the NetWare

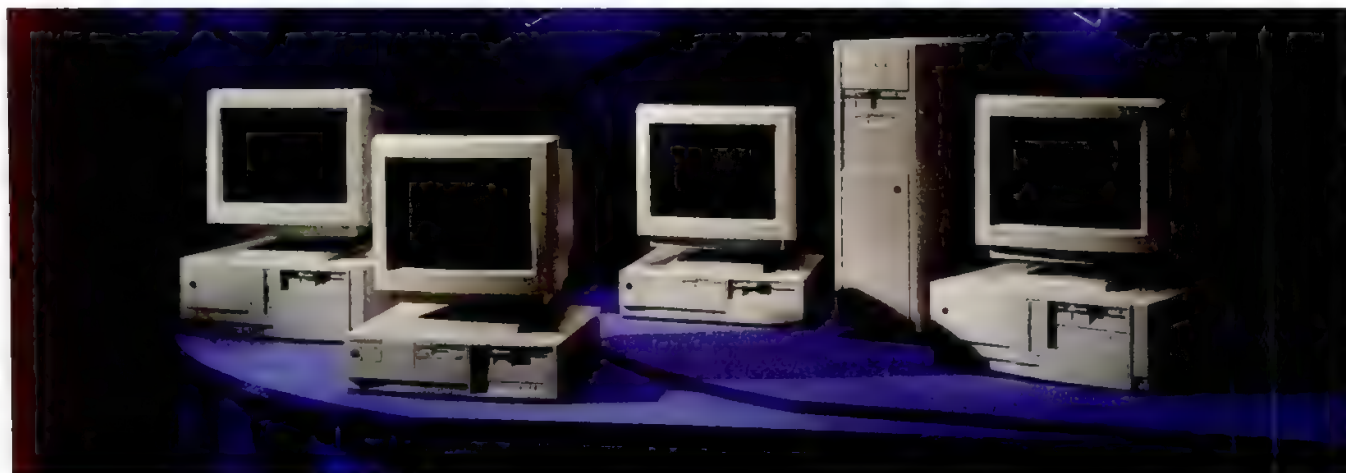


NEW BREED

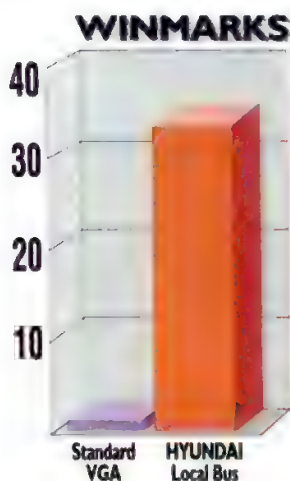




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- pitch, 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base
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- 5 external drive bays, 2 internal
- 7 slots incl. 1 VESA Local Bus slot
- 200 watt power supply
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- 8MB system memory expandable to 64MB on board
- 360MB 12ms IDE HDD, 256KB disk buffer
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- 14" non-interlaced, ultra-high resolution, .28 dot

- pitch, 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base
- 25/1P, integrated PS/2 mouse port
- 5 external drive bays, 2 internal
- 7 slots incl. 1 VESA Local Bus slot
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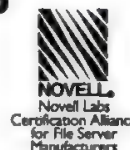
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Workgroup Scheduling

Bindery, so the administrator will be spared adding users one at a time.

The interface, though not pretty, is straightforward. The main screen includes an appointment book, a to-do list, a Deadlines box, a Notes box (which doesn't automatically wrap text), and a small monthly calendar. The menu box (which doubles as the mediocre on-line help screen) fills the lower left-hand cor-

ner of the screen. There are also large month and year views.

For group scheduling, NetCal displays a match-up grid. In it, a list of selected users and their schedules is displayed in a rather cryptic sliding chart. Functions such as changing the user calendar view and searching for free time, are easily accessed through Alt-key combinations.

Despite its stark, character-based in-

terface, NetCal supplies some of the best printed output of the three products examined here. In fact, it was the only one that provided an output format suitable for a trifold, traveling planner.

SCHEDULE+

While it is the most fully realized scheduling package of these three, Microsoft Corp.'s (206-882-8080) Schedule+ 1.0 (\$195 for two users), is a Windows-only product and requires Microsoft Mail 3.0 to run. Without Mail, it becomes little more than a decent personal scheduler.

Thanks to Mail, administrators of Schedule+ are relieved of the necessity of setting up the user base. The package does, however, come with a simple administrator program that's useful for adding and deleting users and managing multiple post offices.

Schedule+'s somewhat cluttered screen uses a notebook metaphor to offer three main views: Appointment Book, Planner, and Task List. A Messages window is iconized at the bottom of the screen. It opens into a very Mail-like message box.

Scheduling a group meeting is a simple, fluid task under Schedule+. Once inside the planner—a graphic chart that displays two and a half weeks' worth of meetings at once—users can easily add and delete other user names from the Attendee list and turn on or off views of other user's schedules overlayed on top of their own. Resources can also be included in the Attendee list.

Once attendees are selected, you can ask Schedule+ to Auto-pick an open day and time and an available room for a meeting. The package then highlights an open box on the chart, which indicates a potential meeting time. A double click on the box automatically moves you to the Schedule Meeting dialog box, where you can accept the meeting time and duration or choose to change it, add a meeting description, and add a short note. You can also request an RSVP. Click on OK and the meeting is booked for you; a meeting request will be sent to everyone on the Attendee list.

Schedule+ isn't a perfect solution. First, you are tied to Microsoft Mail. Furthermore, you can't schedule recurring group meetings and there's no TSR to remind you of meetings when you're outside Windows.

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WORKGROUP SCHEDULING

The Integrated Approach

BY RON ANDERSON

Another approach to the group scheduling problem is to adopt a more encompassing office solution that includes a group scheduling component.

PC Magazine has put together this overview of the group scheduling component of eight integrated office groupware packages. Among the added goodies you'll find in these packages are project management tools, in/out pegboards, and address-book databases.

ABOVE & BEYOND FOR WINDOWS

Above & Beyond for Windows 1.0 (\$495 to \$898), from 1Soft Corp. (707-987-0256), is a serious, Windows-only time management package for single users or groups. A brief glance at the user manual will clue you into the fact that 1Soft is serious about helping you get the most out of your time. The fervor with which 1Soft has approached the task of time management has yielded good results.

Above & Beyond offers drag-and-drop scheduling with "dynamic time reorganization." The package devotes a menu selection to helping users juggle their schedules. Appointments can also be fixed in time when they need to be. Fixed appointments aren't affected by dynamic rescheduling.

Above & Beyond makes group scheduling easier than you ever thought possible via Meeting Maker. Just tell Meeting Maker when you'd like to meet, how long you want the meeting to last, and who should attend the meeting, and then press the search button. Meeting Maker will return the first available block of common free time. If you'd like to explore

additional times, just click on the Next button. When you're satisfied, click on the Schedule button and Meeting Maker takes care of the rest. This is the way group scheduling should work.

ENTERPRISE: WHO WHAT WHEN

Enterprise: Who What When 1.1p (\$695), from Chronos Software (415-206-0580), is a DOS groupware product that includes personal scheduling, group and resource scheduling, time management, and an address database. Enterprise's time management module expands the more typical group and resource schedul-

ing components found in other groupware products to include both project and people management. If these additional capabilities are important to you, give Enterprise a look; otherwise you can probably do better for yourself with another contender.

Entering personal or group tasks is accomplished, once again, by filling in a predefined entry form. Most users will not find this task difficult; however, Enterprise suffers the same fate as Higgins Group Productivity Software in that it

*Enterprise's
time management
module expands
group and resource
scheduling.*



1Soft Corp.'s Above & Beyond for Windows, Version 1.0, devotes an entire menu selection to helping users juggle their appointments.

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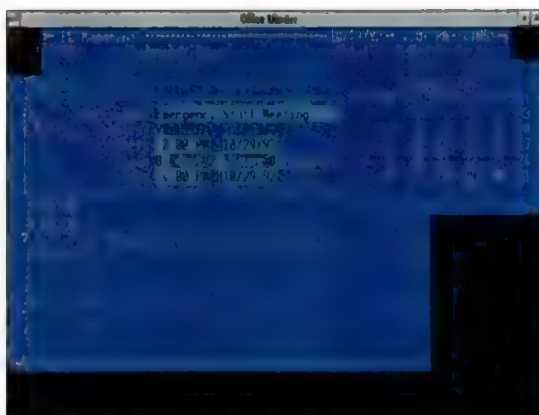
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SOFTWARE
Workgroup Scheduling

cannot search for common free time among users for you. At best, Enterprise warns you of conflicts, but it is still up to you to find the common free time when you are scheduling a group meeting.

HIGGINS GROUP PRODUCTIVITY SOFTWARE

Higgins Group Productivity Software 2.42 (\$695 to \$1,495), from Enable Software (518-877-8600), is a DOS-only groupware product that includes a proprietary e-mail system, a personal calendar, and group and resource scheduling, among other functions. Version 2.42, current as of this overview, was announced in October 1990 at Networld. (Version 2.5 was not ready at press time. Enable says OS/2 and Windows versions should be ready in early 1993.) It's a solid program that performs its functions well, but it has an old, tired look that makes it unappealing for today's users.



The calendar interface in OfficeMinder is a simple fill-in-the-blank form, so users should have little trouble scheduling appointments.

Higgins contains few surprises, and most users should be able to schedule personal and group appointments and meetings and send mail with very little prompting. This program is not difficult to use as far as it goes. The problem is that it doesn't go far enough. Higgins will automatically find common free time when scheduling a group meeting, but

only for a day at a time. The Windows version is expected to include an automatic search function that can scan across any given amount of time.

OFFICEMINDER

When you begin your search for group scheduling software, put OfficeMinder 1.62 (\$395 to \$2,495), from Century Software (414-673-4424), high on your list of contenders. The people at Century Software have done their homework and produced a well-constructed integrated package that covers most of the bases. OfficeMinder is a DOS-only groupware package that includes a personal calendar, group and resource scheduling, e-mail, an address database, an electronic bulletin board system, an electronic in/out pegboard, and full mouse support.

Users should have no trouble filling in the forms to schedule personal appointments or group meetings. OfficeMinder will search for and display common free time for a group appointment and provides options to fine-tune the meeting's particulars. The on-line help system is



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Workgroup Scheduling

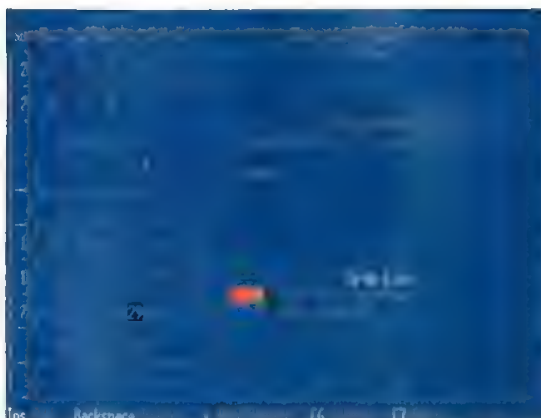
context-sensitive and includes hypertext.

OfficeMinder is well worth serious consideration for organizations looking for a DOS-only group scheduling or group productivity package. Not only are the basics very well implemented, but the additional modules included with this package should provide an additional boost to your company's productivity.

PARADIGM VII AUTOMATION PLUS

Paradigm VII Automation PLUS 4.0 (\$995 to \$1,995), from Chesapeake Computing (301-459-7376), is a DOS-based, integrated groupware product that provides users with group scheduling plus project management, a personal calendar, contact information management, and e-mail. Because of its tight integration, Paradigm makes most sense in a WordPerfect environment.

Scheduling a personal or group meeting is a fill-in-the-form process with a twist: Users must use the Return key to move from field to field rather than the Tab key. In other respects, Paradigm's user interface is typical of current-day



The calendar in the network version of WordPerfect Office is uninspiring but functional—WordPerfect aficionados should be right at home.

DOS applications, making use of nested pull-down menus and function- and control-key combinations to enable users to navigate around the program's various functions. Mouse support is not available.

The group scheduling function is not as state-of-the-art as the interface. Paradigm can notify you when your proposed meeting conflicts with other participants'

calendars, but it is unable to search for a time with no conflicts.

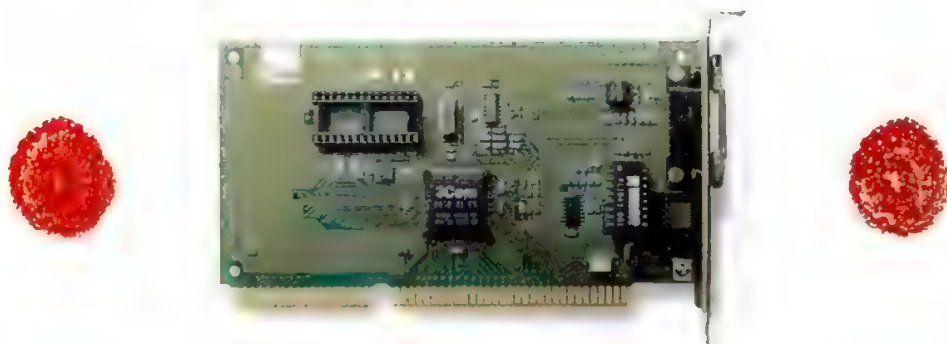
There's no compelling reason to consider Paradigm if you aren't a WordPerfect shop. Paradigm is built to work with WordPerfect and can manage your day-to-day contact information in a database that WordPerfect can easily access for mail-merge follow-up.

QED OFFICE

Strategic Marketing Associates' (310-378-7632) QED Office 2.01 (\$495 to \$1,595) is a DOS-based suite of integrated

office modules.

One of the strengths of QED is its time-billing and cost analysis modules. If your office personnel keep track of their time for charge-back billing and your computers are primarily DOS-based, QED is worth a look. The developers of QED have taken numerous steps to help users navigate through the program, pro-



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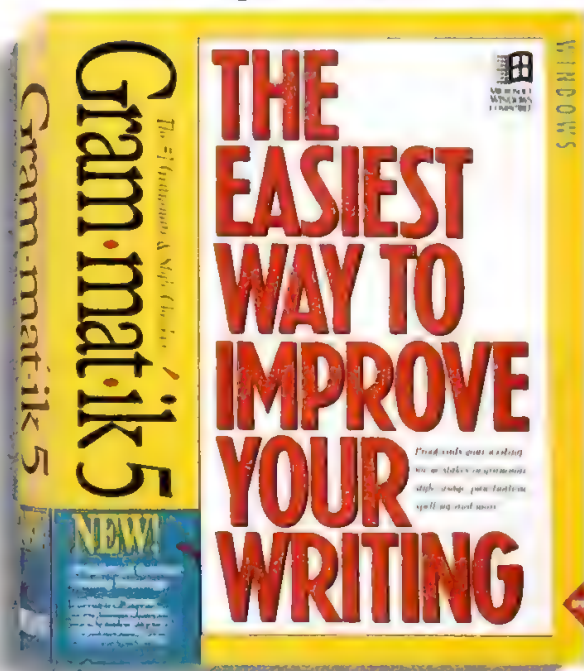
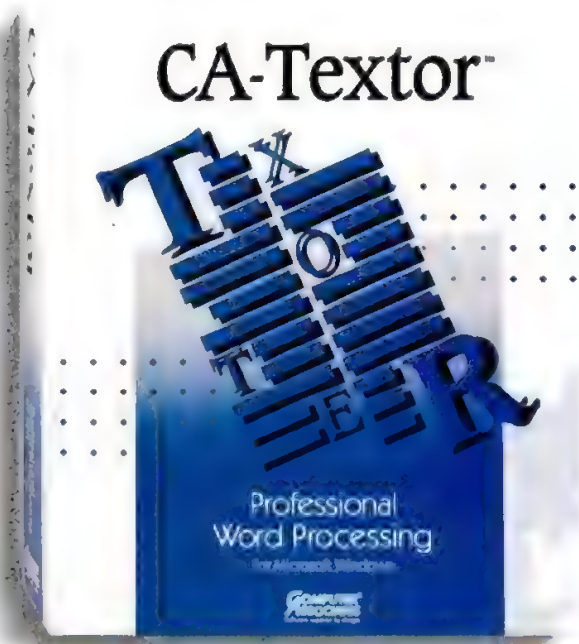
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Workgroup Scheduling

viding them with pull-down menus, function keys, mouse support, and context-sensitive on-line help.

QED guides you through the rather involved process of scheduling a group meeting and automates some of the more arduous tasks—such as finding a common time for the meeting and notifying the participants via e-mail—but the number of steps involved in the process could prove discouraging to some.

The cost of learning to use this package will be high, but the benefits can outweigh the costs given the right office setting. Built-in time and cost analysis functions may make the complexity of some of this package's functions bearable. With the addition of full-featured e-mail, a tickler file, an address book, a word processor, a filing cabinet, and a presentation manager as integrated components, QED may be worth your effort.

SUPERTIME

SuperTime 1.1 (\$295 to \$695; Version 1.2 was released too late to be included here), from SuperTime (416-764-3530), is a DOS-based, full-scale office work flow solution. It consists of four main modules: Message, Project, Calendar, and To-Do.

Scheduling events is not difficult, once you become accustomed to SuperTime's language habits. Thanks to the product's Canadian origins, date and time designations default to British style. For example, 2/10/93 stands for October 2, 1993. Users can, of course, change this.

This quirk aside, SuperTime ably leads you through scheduling group meetings (as long as you don't mind hitting F5 to save instead of the Enter key on each screen). The program automatically prompts you for attendees and resources when you ask to schedule a meeting. It then asks you if you want it to search a particular span of time to schedule your meeting. Unfortunately, the search process is rather slow. SuperTime has an RSVP feature (though it calls it a request).

In a nutshell, SuperTime can do group scheduling with the best of them, and, with added features like an in/out board, stands poised to do much more.

WORDPERFECT OFFICE FOR PC NETWORKS

Another good choice for WordPerfect offices is WordPerfect Office for PC Net-

works 3.1 (\$495 to \$5,995). It's a good bet for shops that have standardized on WordPerfect Corp.'s (801-225-5000) suite of applications software and are interested in e-mail and group and resource scheduling. The implementation is stan-

*WordPerfect Office
automates the process
of searching for
common free time
when scheduling a
group meeting.*

dard from WordPerfect's perspective (F3 for help, F5 to list, F7 to exit, and so on), so current WordPerfect users will need only minor training to become comfortable with WordPerfect Office.

The WordPerfect Office shell is a DOS menuing system that forms the ba-

sis for the office suite of applications. The applications included with the network version of the shell include selections for e-mail, group and resource scheduling, a file manager, a text editor, a calculator, an appointment calendar, a notebook (a mini database manager), and a TSR manager. The product does not include mouse support.

For the most part, entering personal appointments and group meetings is a simple fill-in-the-form process. Scheduling a personal recurring appointment is a different matter. This type of appointment can only be entered via an auto-date formula, and there is nothing intuitive or easy about figuring out what to enter into the formula.

WordPerfect Office does automate the process of searching for common free time when scheduling a group meeting. Overall, this package covers most of the bases, especially if you're in a WordPerfect shop. The upcoming Version 4.0 (scheduled to ship in the first half of 1993) will include support for DOS, Windows, and the Macintosh. □

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CIRCLE 017 ON READER SERVICE CARD

COMPUTERS

How Good Is Your PC?

We asked 17,000 subscribers to rate the companies that sell PCs. The vendors fared well, but there are shortcomings.



The personal computer industry has undergone some wrenching changes in the nine months since we last looked at service and reliability. Many companies that once offered mostly high-priced, premium machines have introduced lower-priced systems. Compaq Computer Corp.'s launch of its Pro-Linea line last summer triggered similar actions by other major manufacturers, which either offered their own "value lines" (such as Dell's Dimension and IBM's PS/ValuePoint) or lowered prices on their existing lines. Some did both.

This compression of both price and margin has been instrumental in making newer, more powerful machines affordable to more users. At the same time, even some larger vendors that have traditionally relied on dealers for repair service and technical support have begun

by Michael J. Miller

to understand the attraction of manufacturer-provided support and service. However, there has been some consumer concern that as prices drop, quality control and technical support might be sacrificed.

That concern seems to have some basis in fact. The results of our latest service and reliability study show that overall system reliability and customer satisfaction with technical support and repair experience have dropped significantly from our previous study ("How Reliable Is Your PC Vendor?" *PC Magazine*, May 26, 1992). We also found some significant shifts in the service and reliability ratings given to specific vendors and their products.

Indeed, as performance continues to increase and prices continue to fall, reli-

bility, repair, and support have become more important to buyers than ever. As a result, starting with our issue of February 23, 1993, each of our PC reviews

*As performance continues
to increase and prices
continue to fall, reliability,
repair, and support become
more important.*

will include survey ratings of overall system reliability and customer satisfaction with repair experience and technical support. We will offer this information on all

vendors for which we have adequate data. Also, because of the continuing changes in the PC market, we have decided to conduct our service and reliability survey every six months. We will publish the results and update the ratings for each vendor in our reviews as the numbers become available.

To gather the results in this issue, we sent surveys to 17,000 randomly selected *PC Magazine* subscribers last fall, asking them to rate on a scale of 1 (the lowest) to 10 (the highest) the overall reliability of each PC they have used during the past two years. We also asked them to rate their own satisfaction with repair experience and technical support. The accumulated ratings of individual machines gave us an assessment of the overall quality of a vendor's product and service. In addition, we questioned readers regarding the likelihood they would purchase another machine from the same vendor.

We collected responses from 8,176 readers from September 2 to November 17 of last year—a 50 percent response rate, excluding the 527 surveys returned to us as undeliverable. We considered 50 responses per vendor the minimum we needed in order to acquire enough data for an accurate analysis of each company's performance.

Note that whether a vendor is significantly above or below average depends not only on the score but also on the number of respondents. Thus, a higher or lower absolute score may not indicate a rating that differs significantly from the average. In this discussion, we focus only on ratings that are significantly different. Vendors are listed in descending order of their ratings on single measures. Other references to companies are in alphabetical order. *PC Magazine's* survey was conducted in conjunction with Willard & Shullman, an independent research firm based in Greenwich, Connecticut.

In this latest survey, desktop computers from seven vendors—AST Research, Dell Computer Corp., Digital Equipment Corp., Gateway 2000, Northgate Computer Systems, Swan Technologies, and Zeos International—stood out from the crowd. They earned results that significantly exceeded the average rating for system reliability and customer satisfaction with repair experience and technical

HIGHLIGHTS

The Reader Survey

COST CUTTING has swept the computer industry, but our readers remain highly satisfied with the quality of machines they have bought. Reliability ratings remained high, although we saw a slight drop from the survey we took nine months earlier.

SERVICE is everything in our survey. Among desktop-system vendors, Digital Equipment Corp., which completely revamped its distribution and service operations in 1992, and Western Pennsylvania-based Swan Technologies landed in the top level (Excellent). Readers rated them above average on all three measures we examined: overall system reliability and customer satisfaction with repair experience and technical support.

AMONG LAPTOP MAKERS, Compaq Computer Corp. and Zeos International sit alone at our highest level of reader satisfaction, while CompuAdd Express, Dell Computer Corp., Everex Systems, IBM, and Toshiba America Information Systems are crowded onto the second tier (Above Average). One newcomer to our list, Apple Computer Corp.—with its hot-selling Macintosh PowerBooks—

landed in the third level with average scores on all three measures.

ACER AMERICA CORP., AT&T Computer Systems, Hyundai Electronics America, Tandy Corp./GRiD Systems Corp., Wyse Technology, and Zenith Data Systems placed poorly among the 35 desktop vendors rated. Bondwell Industrial Co. and ZDS were last in the laptop group, with below-average scores on all three service and reliability measures. Some of these companies plan to revamp their distribution and support policies.

READERS continued to give manufacturers higher marks for system reliability than they did for repair experience and technical support. Ratings for satisfaction with repair service and technical support were lower for laptops than they were for desktop systems, possibly a reflection of the fact that laptops get banged around more.

THE MORE POWERFUL the CPU, the happier our readers have been with their systems. This reflects our perception that more-powerful CPUs populate newer machines, making them less prone to breakdowns.

support. Laptop computers from Compaq and Zeos also received significantly above-average ratings on all three of our measures. These vendors each receive our Readers' Choice award for Service and Reliability.

HOW DESKTOP SYSTEMS RATED

In general, our readers remain more impressed with the overall reliability of their machines than with repair service and technical support. On the 1 to 10 scale mentioned earlier, the average reliability rating the vendors received for desktop machines was 8.3. This figure falls significantly below last year's 8.5 but still indicates a high degree of satisfaction. As before, machines based on newer processors received higher ratings for reliability, and machines at higher power levels received higher ratings than those at lower levels. Greater reliability may be due to the fact that machines with the more powerful processors are also likely to be newer.

In overall reliability, the top scores went to Swan (9.1) and Gateway 2000 (9.0). Other manufacturers that scored significantly above average were (in descending order of scores) Dell, Compaq, Zeos, Digital, Hewlett-Packard Co., Northgate, AST, IBM, and NEC Technologies. This group includes both the largest and best-known companies in the PC business, as well as the largest direct-marketing PC vendors. This suggests that across distribution channels, reliable products are critical to sustained growth in the PC business.

Scoring significantly below average in overall reliability were desktop systems from Tandy Corp./GRiD Systems Corp., Zenith Data Systems, AT&T Computer Systems, Leading Edge Products, NCR Corp., Acer America Corp., Wang Laboratories, Wyse Technology, Hyundai Electronics America, and Memorex Telex Corp.

In the past nine months, one of the biggest gainers was Digital, which completely revamped its computer line in 1991. This move seems to be paying off, both in better results and in higher PC sales. The biggest drops in overall reliability ratings were for machines from Hyundai, Acer, NCR, and Tandy/GRiD.

Reliability is important, but what if your machine does need to be repaired?



READERS' CHOICE

- **Desktop Systems:** AST Research, Dell Computer Corp., Digital Equipment Corp., Gateway 2000, Northgate Computer Systems, Swan Technologies, Zeos International
- **Laptop Systems:** Compaq Computer Corp., Zeos International

Vendors that earned significantly above-average scores on our reader survey for overall system reliability and customer satisfaction with repair

experience and technical support received our Excellent rating and are the winners of our Readers' Choice award for Service and Reliability.

Among desktop-system vendors, seven managed high scores on all three measures: AST Research, Dell Computer Corp., Digital Equipment Corp., Gateway 2000, Northgate Computer Systems, Swan Technologies, and Zeos International.

Among laptop vendors, just two—Compaq Computer Corp. and Zeos—won our highest rating. But five—CompuAdd Computer Corp., Dell, Everex Systems, IBM, and Toshiba America Information Systems—ranked in the next level, where companies turned in a combination of average and significantly above-average scores on all three of our measures.

On the average, readers rated their satisfaction with repair experience at 7.6, lower than both the repair-service result of the last survey (7.9) and this year's average overall reliability rating (8.3).

Many of the vendors that scored well in reliability also did well in service. Texas Instruments (8.8), Swan (8.7), Gateway 2000 (8.6), and Dell (8.5) scored the best here, with other significantly above-average scores reported for Northgate, Zeos, Digital, CompuAdd Computer Corp., Everex Systems, AST, and IBM.

It is interesting to note that most of the top scorers here are vendors that emphasize direct marketing. It appears that most readers are happier with vendors that service their own machines or use nationwide third-party service organizations than they are with those that rely on individual dealers. The notable exceptions here are AST and Everex, which rely mainly on their dealer networks, and CompuAdd, which sells machines through its own stores in addition to direct marketing.

In the past nine months, the company that has improved the most in repair-experience satisfaction has been Texas Instruments. Even so, the number of re-

spondents for TI in terms of desktops fell because the company has been emphasizing laptops rather than desktops. The biggest drops concerning satisfaction with repair service in this survey were reported for Acer, NCR, Wyse, Austin Computer Systems, Packard Bell Electronics, and Unisys Corp.

Our technical-support measure yielded even more uneven results; the average score was 7.3. Big-name direct vendors such as Swan (8.8), Dell (8.6), Northgate (8.6), Gateway 2000 (8.2), Zeos (8.2), CompuAdd (8.0), and Digital (8.0) topped the survey, showing again that readers are happiest with those manufacturers that emphasize their own technical support on toll-free numbers. Among vendors that rely primarily on dealer channels, only AST and Hewlett-Packard scored significantly above the average. All manufacturers that rated significantly below the average in technical support satisfaction—including Tandy/GRiD, Advanced Logic Research, ZDS, NCR, AT&T, Packard Bell, Leading Edge Products, Wyse, Acer, and Hyundai—have relied heavily on dealer channels (although ALR, Hyundai, and ZDS have begun direct marketing in recent months).

How You Rated the Vendors

We mailed questionnaires to 17,000 randomly selected *PC Magazine* subscribers. We asked them to rate by vendor the desktop and laptop systems they had used during the past two years. We grouped the results in two

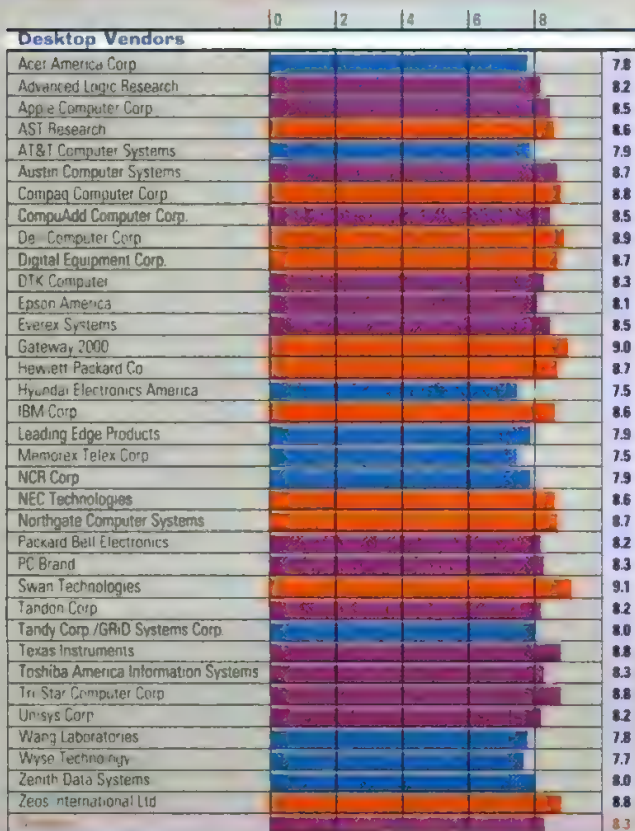
separate categories: desktop system vendors and laptop system vendors. We tabulated the results from the 8,176 responses we received from September 2 to November 17, 1992.

The scores in this chart cover four

areas of service and reliability that we asked readers to assess: satisfaction with the reliability of their PCs, satisfaction with repair experience, satisfaction with technical support, and the likelihood they will buy again from the

Overall reliability

■ Significantly below average ■ Significantly above average ■ Average



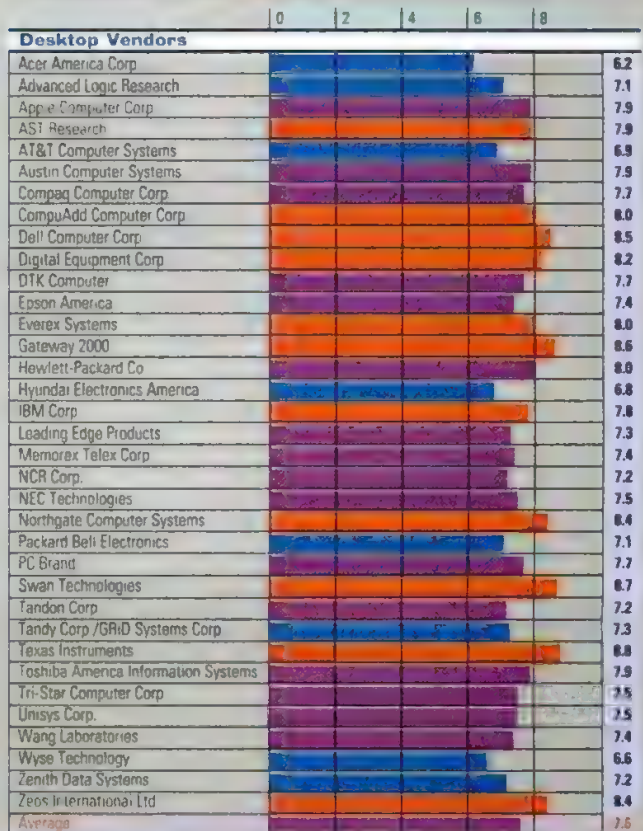
Laptop Vendors



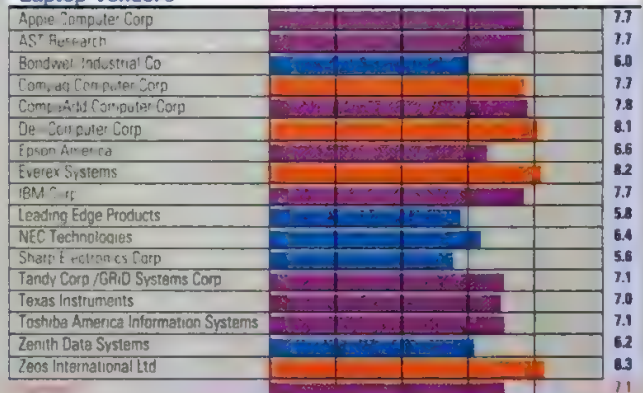
Worst BEST

Satisfaction with repair experience

■ Significantly below average ■ Significantly above average ■ Average



Laptop Vendors



Worst BEST

same vendor. The respondents supplied ratings on a scale of 1 (worst) to 10 (best). We have listed only those vendors for which we received at least 50 responses.

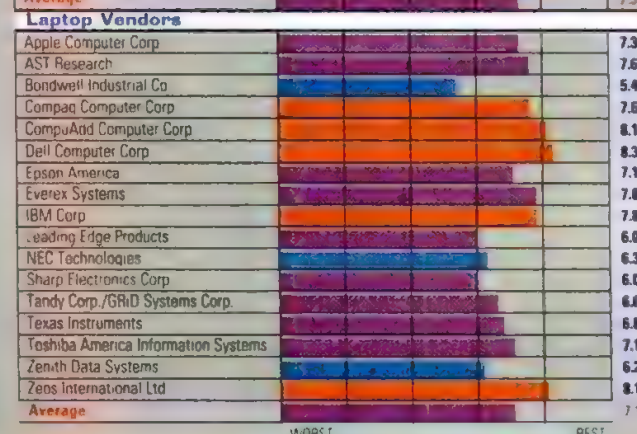
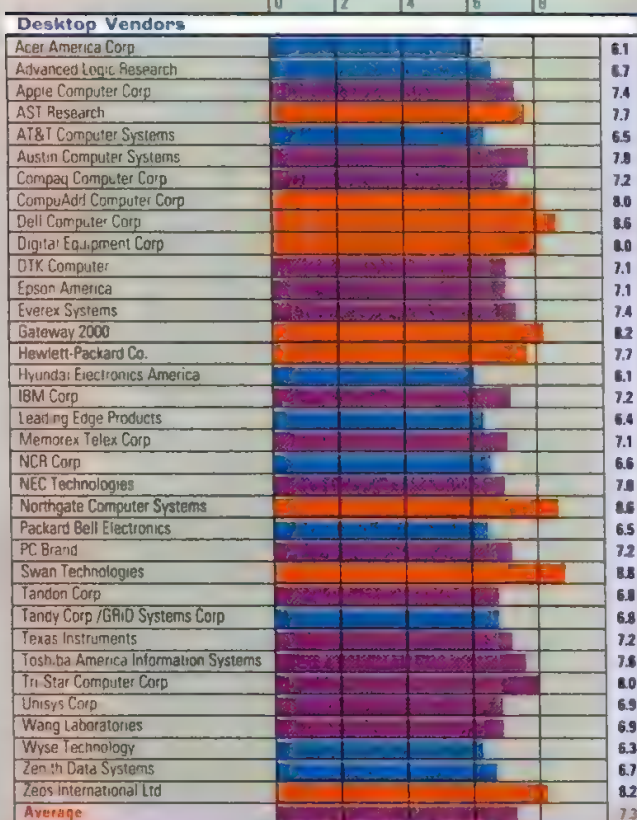
The scores listed here are averages

based on all the response scores received for each vendor. Higher numbers on this chart mean higher average ratings, but the statistical importance of the difference between one score and another depends on the number of re-

sponses as well as the actual scores. A slightly higher score does not always mean a significantly better average rating. (See the chart "Ranking the PC Vendors" for statistically significant groupings of vendors.) □

Satisfaction with technical support

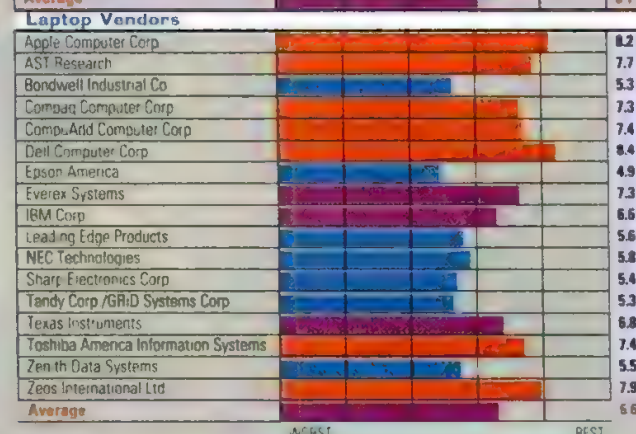
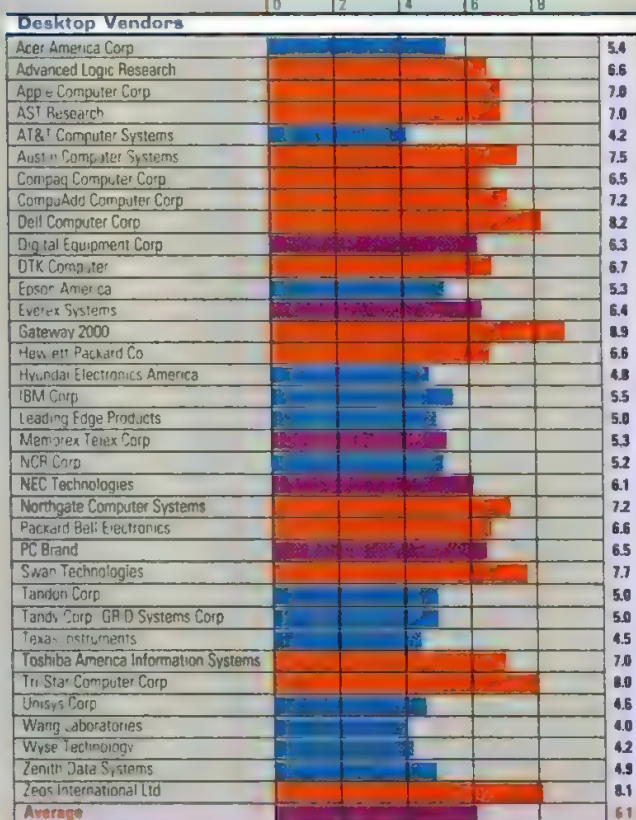
■ Significantly below average ■ Significantly above average ■ Average



WORST BEST

Future likelihood of buying from the vendor

■ Significantly below average ■ Significantly above average ■ Average



WORST BEST

There Is In Nu



TravelMate™ 4000 WinSX™ or WinDX™/25MHz

- 4MB RAM std. (20MB max.)
- 120MB HDD
- 5.6 pounds

\$2,799/\$3,299 SRP*



TravelMate 4000 WinDX2™/50MHz

- 8MB RAM std. (20MB max.)
- 200MB HDD
- 5.6 pounds

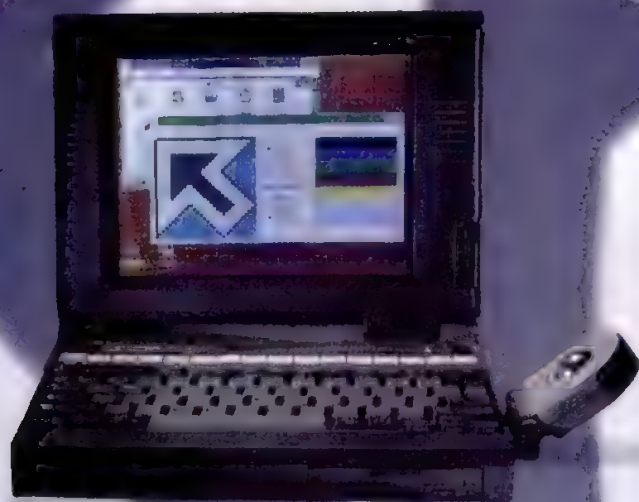
\$3,899 SRP*

Texas Instruments comes on strong with the widest selection of powerful 486 notebooks at incredible prices. From 25MHz to the world's most powerful 50MHz notebook in a 5.6-pound package, there's a TI TravelMate just for you.

Take a look at these numbers. You get superior 486 performance with an extraordinary three to five hours of battery life.



Strength Numbers.



TravelMate 4000 WinSX/25MHz COLOR

- 4MB RAM std. (20MB max.)
- 120MB HDD
- 6.3 pounds
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TravelMate 4000 WinDX2/40MHz COLOR

- 8MB RAM std. (20MB max.)
- 200MB HDD
- 6.3 pounds
- \$4,499 SRP*

On our color models, you get 256 simultaneous brilliant colors on a large 9.4" display. All these numbers add up to outstanding performance and value.

There's one more important number. For more information and the dealer nearest you, call 1-800-527-3500.

 **TEXAS
INSTRUMENTS**

*Manufacturer's Suggested Retail Price. Dealer prices may vary.

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We have grouped the vendors in this survey into five categories based on their overall ratings in reliability and customer satisfaction with repair experience and technical support (see the chart "Ranking the PC Vendors"). Seven firms top the list because they scored significantly above average on all three measures and consequently form our list of readers' choices for service and reliability. The top seven are AST, Dell, Digital, Gateway 2000, Northgate, Swan, and Zeos. Vendors that received combined ratings of significantly above average and average on our measures fell into the second-highest category. These companies are Compaq, CompuAdd, Everex, Hewlett-Packard, IBM, NEC, and TI. It is interesting to note the presence of Digital in the top category, which is an achievement perhaps spurred by recent organizational

Gateway 2000 scored tops in the likelihood that respondents would buy another computer from the same vendor, with a strong score of 8.9. Dell scored 8.2, significantly higher than it managed nine months ago. Zeos turned in a score of 8.1, which though impressive marked a significant drop from its last time out. Tri-Star Computer Corp., appearing for the first time in this survey, scored an 8.0 in this area. It is interesting to note that while Digital earned only an average score of

Compaq and Zeos were the only laptop vendors to score significantly better than average in reliability and customer

Chip Type	0	2	4	6	8	Score
8086 8088	[Bar from 0 to ~7.8]					8.2
80286	[Bar from 0 to ~8.2]					8.3
80386SX	[Bar from 0 to ~8.6]					8.6
80386	[Bar from 0 to ~8.7]					8.7
80486SX	[Bar from 0 to ~8.8]					8.8
80486	[Bar from 0 to ~8.9]					8.9
Average	[Bar from 0 to ~8.6]					8.6

WORST BEST

■ Ranking the PC Vendors

We have grouped the vendors in this survey into five categories. Those who received significantly higher scores than the average in all three measures of service and reliability were rated Excellent, those who received a combination of average scores and scores significantly above the average were rated Above Average. The group ranked Average scored average in all three measures or received a combination of above- and below-average scores. The group ranked Below Average scored a combination of average and significantly below the average on our measures. Those rated Poor scored significantly below the average on all three key measures. □

Desktop PCs

Number of Responses

Excellent	
AST Research	585
Dell Computer Corp.	723
Digital Equipment Corp.	124
Gateway 2000	1,300
Northgate Computer Systems	365
Swan	93
Zeos International Ltd.	464
Above Average	
Compaq Computer Corp.	1,332
CompuAdd Computer Corp.	487
Everex Systems	387
Hewlett-Packard Co.	300
IBM Corp.	3,231
NEC Technologies	324
Texas Instruments	49
Average	
Apple Computer Corp.	498
Austin Computer Systems	88
DTK Computer	442
Epson America	332
PC Brand	142
Tandon Corp.	62
Toshiba America Information Systems	166
Tri-Star Computer Corp.	61
Unisys Corp.	185
Below Average	
Advanced Logic Research	231
Leading Edge Products	358
Memorex Telex Corp.	70
NCR Corp.	118
Packard Bell Electronics	679
Wang Laboratories	112
Poor	
Acer America Corp.	165
AT&T Computer Systems	293
Hyundai Electronics America	145
Tandy Corp./GRiD Systems Corp.	425
Wyse Technology	137
Zenith Data Systems	658

Laptops

Number of Responses

Excellent	
Compaq Computer Corp.	509
Zeos International Ltd.	125
Above Average	
CompuAdd Computer Corp.	96
Dell Computer Corp.	169
Everex Systems	56
IBM Corp.	157
Toshiba America Information Systems	745
Average	
Apple Computer Corp.	70
AST Research	145
Epson America	52
Tandy Corp./GRiD Systems Corp.	152
Texas Instruments	73
Below Average	
Leading Edge Products	48
NEC Technologies	141
Sharp Electronics Corp.	61
Poor	
Bondwell Industrial Co.	88
Zenith Data Systems	470



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COMPUTERS

Service & Reliability

satisfaction with repair experience and technical support, thus earning our Readers' Choice award in the laptop category.

Although Dell didn't make it into the top group (because its reliability scores were only in the average range), it did top another measure that may be even more important: the future likelihood of a user to buy another laptop from the same vendor. Dell's 8.4 mark in this category was most closely challenged by the 8.2 reported for Apple Computer. But Zeos, AST, CompuAdd, Toshiba, and Compaq also managed marks that were significantly better than average.

LOOKING AHEAD

As you look over the service and reliability ratings in the accompanying tables, be aware that these results are only a guide to help you assess how a company has been perceived by *PC Magazine* subscribers over the past two years. Re-

*In overall reliability,
Everex—a newcomer to
the laptop portion of the
survey—topped everyone,
followed by last year's
leader, Zeos.*

spondents' views are based on what they remember of their experiences with vendors and on their overall perceptions of companies. Their opinions are subject to change as manufacturers revamp their product lines and technical support and service options.

This kind of survey can only tell you how a company has performed in the recent past, not how it will perform in the future. Special features, performance, options, and price are also important criteria in selecting the right machine and the right vendor.

Watch *PC Magazine* for similar surveys throughout the year. We ran the results of our printer reliability survey in our November 24, 1992, printer block-buster issue. Results of our survey on monitor service and reliability will appear in our March 16 issue. □

THE OS/2 1000

**OS/2 BOOSTS YOUR PRODUCTIVITY IN
HUNDREDS OF WAYS. HERE ARE THE FIRST 100.**

There are at least 100 reasons to consider OS/2®. They range from the substantial (the ability to solve complex problems with information that originates from multiple sources) to the sublime (it looks cool and is fun to use). In between, this enterprise-

strength operating system brings both large and small benefits to anyone who uses a PC: OS/2 guides you into new computing territories instead of confining you within the boundaries of older technology.

On the following pages, we list 100 of the most exciting aspects of OS/2 today. This is just the beginning.

OS/2 HAS ARRIVED

1 OS/2 IS HERE, NOW

The greatest advantage OS/2 has over its perceived competition is the fact that it is available now. Today. Anyone who wants to gain 32-bit personal computing power can buy a copy of OS/2 and install it on their machine. There is no waiting. There are no lines. There are no promises about something that will arrive in a month, six months or a year. It's here. For real.

2 ONE OS/2 SIZE FITS ALL

People—from the most naive beginner to the busiest expert—need a variety of computers. As these needs converge, people may try to engage two or more machines to complete all their computing tasks. To add to the confusion, some vendors sell (or will sell) one operating system for the end user and another for networks and power users.

OS/2 offers a system that is intended to reach across these boundaries and provide enterprise-strength functionality. It supplies beginners with ease-of-use and brings hardcore power to the most technical users. And while there are minimum hardware requirements for OS/2, they do not exceed those for the majority of the PCs sold today. So OS/2, in its standard configuration, is suited for everyone: From the person with a 16 MHz 386 SX to the MIS director of a large bank. As user's needs evolve, IBM will offer specific versions of OS/2 for different platforms—all running across the computing enterprise while using a common operating environment.

3 OS/2 IS FLEXIBLE

Anyone who uses a PC today deals in multiples. Central information originates from several diverse sources. It is likely you work with a variety of applications at work, at home, on the road and on the network. As a result, you can't settle for anything less than flexibility and portability.

OS/2 performs well in any of the three primary computing environments:

desktop, mobile and network. Whether on one desktop or connecting to many, data transfer is easy, and you only need to learn one computing style—or language—to deal with all the information that you face during any computing day.

4 OS/2 PROTECTS YOUR PERSONAL COMPUTING INVESTMENT

The first step in designing a computing environment

is to determine the task that needs to be accomplished and then select the software that completes the task. The next step is to procure the machines—and the operating system—on which the applications will operate.

These choices, however, are always a lot harder than they sound. Nobody uses just one program to perform a sin-

gle task. Instead, they are using several different packages to accomplish disparate functions. Some software may be obsolete but is not replaced because of a personal, personnel or financial investment. Or it's not replaced because it still does the job. In either case you can benefit from OS/2, as it supports the most important past and present application software programs and will continue to do so in the future.

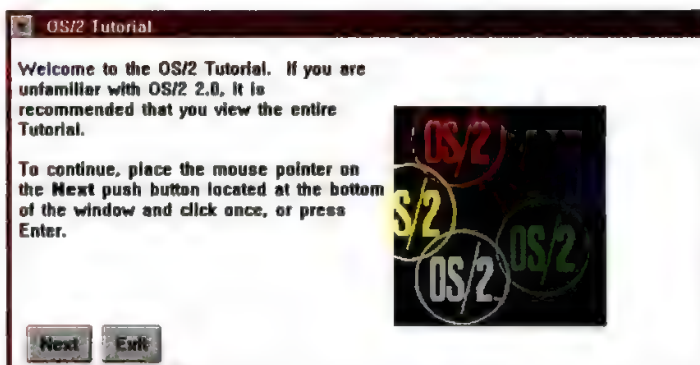
gle task. Instead, they are using several different packages to accomplish disparate functions. Some software may be obsolete but is not replaced because of a personal, personnel or financial investment. Or it's not replaced because it still does the job. In either case you can benefit from OS/2, as it supports the most important past and present application software programs and will continue to do so in the future.

6 OS/2 IS EVERYWHERE

After OS/2 was released, there didn't seem to be enough copies to go around. People who heard about OS/2 and wanted to take it on a test drive had trouble getting a copy. This is no longer the case. OS/2 is available through all the most convenient retail and direct channels—essentially everywhere that better software is sold. And if you have trouble finding a copy of OS/2 in your neck of the woods, you can always contact IBM directly, by calling (800) 3IBM-OS2 (342-6672). (In Canada, call (800) 465-7999.)

FIRST THINGS FIRST

The OS/2 Tutorial, accessible from the Information Folder, leads the new user through a step-by-step primer on the most important highlights of OS/2. Browsing through the Tutorial in the beginning can save time later.



gle task. Instead, they are using several different packages to accomplish disparate functions. Some software may be obsolete but is not replaced because of a personal, personnel or financial investment. Or it's not replaced because it still does the job. In either case you can benefit from OS/2, as it supports the most important past and present application software programs and will continue to do so in the future.

5 OS/2 IS EASY TO LEARN, USE AND ADOPT

OS/2 protects your existing software investment by bringing older products under a new umbrella. It is easy to learn and use, with little training (or retraining) required. So if you have a large team using WordPerfect* on 386-25 PCs, adding OS/2 increases power

7 SO YOU'RE NEW TO OS/2? "START HERE" FOR AN EASY PRIMER

When you first install OS/2, you will notice a Desktop icon—a target with an arrow pointing to its center and labeled "Start Here." Please do. This begins an easy-to-use primer on the most common OS/2 commands and functions. It consists of two windows—topics on the left and information on the right. Double clicking on a topic brings up scrollable information, telling you all you need to get started about that particular aspect of OS/2.

While it is true that OS/2 is generally intuitive, taking fifteen minutes or so to browse through the Online Tutorial—contained in the Information Folder—can build a deeper knowledge of the system and save time later.

8 OS/2 PROVIDES A FAST PATH TO HELP

OS/2 offers continuing education. Just as the tutorial is for beginners, the system's online, context-sensitive help component provides continuing OS/2 education. Access

"Help" (a single right click on any object) by selecting it from the pop-up menu of any application, or hitting the universal F1 key. And the Master Help Index—another Desktop object—is an alphabetical, hypertext-driven list of every element of the system.

And the best news is that the breadth and depth of the online system makes those big-dust-gatherers, "Documentation Manuals," obsolete. The thorough, easy-to-access online help system gives you the information you need when it is needed. So you will never be stuck.

OS/2 IS A POWERFUL OPERATING SYSTEM

9 32-BIT OPERATION ENHANCES SPEED AND PERFORMANCE

Increased speed is the most visible and tangible improvement of a 32-bit system, so it tends to be the first thing that a new OS/2 user will notice. To just say "it goes faster," however, is to tell only part of the story. 32-bit operation provides a wider data path and more efficient memory usage, which changes the way the computer and the software interact.

A 32-bit data path relieves the existing 16-bit memory bottleneck, increasing the overall data transfer rate. This meets the demands of modern processor-intensive applications—at their most demanding on the network server—and provides a clearer path for the manipulation of bitmaps, graphics and numerical data. Developers of 32-bit applications gain access to a large "flat" memory model of up

10 A 16-BIT APPLICATION BENEFITS FROM THE 32-BIT ENVIRONMENT

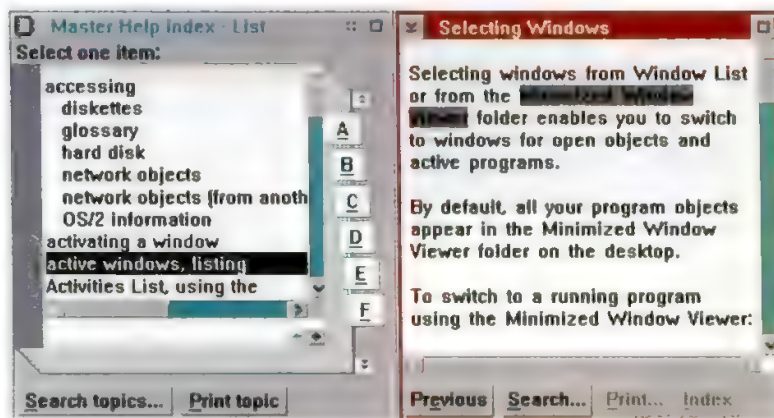
32-bit programs have special speed and function characteristics. They use memory and resources more efficiently, and they provide a more hospitable development environment since the programmer has fewer memory restrictions. While a 32-bit operating system does not change the structure or the operation of a 16-bit program running under OS/2, the 16-bit program can still benefit from an efficiency boost.

Also, OS/2's inherent Crash Protection prevents a misbehaving 16-bit application from invading the individual memory space of other programs—DOS, Windows* or OS/2—running at the same time.

to 512 MB, where they don't need to worry about restrictive segmented architecture that 16-bit programming environments force upon developers. This means you will see more flexible and powerful applications arrive for OS/2 that take advantage of these new capabilities. And these new programs will include unprecedented speed and efficiency.

TIP: INFINITE VIRTUAL

Under OS/2, you can have up to 240 virtual DOS and Windows* sessions. Here, you can tweak individual DOS or Windows sessions with a custom configuration that governs that session and makes any startup changes needed to get the most out of a DOS or Windows program.



HELP AS NEEDED

The Master Help Index—a default OS/2 Desktop object—offers an online, in-depth guide to all of the OS/2 system functions. This alphabetical, hypertext-driven module gives you immediate access to information when it is needed the most.

11 OS/2'S MULTITASKING LETS YOU RUN SEVERAL POWERFUL PROGRAMS

Today's users want their operating system to allow them to perform multiple, simultaneous activities so they can get the most out of their time at the computer. A fully pre-emptive multitasking environment, OS/2 is able to run several concurrent functions while making foreground applications more responsive to the user. This differs from the cooperative multitasking mode used by Microsoft Windows, which requires applications to relinquish control of the processor. This can be inefficient. When Windows executes a background print command, the foreground spreadsheet recalc can take much longer.

Under OS/2, the recalc and the print job run simultaneously and you can even begin a third, fourth or additional task. And as people want to do more with desktop PCs—exchanging information, running data searches and printing long documents are only the beginning—they need true multitasking power to support them.

12 MULTITASKING CHANGES HOW YOU WORK, BECAUSE YOU NO LONGER HAVE TO WAIT

There are a lot of little jobs that slow down your day: Sending or printing a file. Formatting a disk. Installing software. Copying files from one directory to another. Running a database search. In any of these cases, the tendency is to issue the command and then take a coffee break, read the newspaper or return your phone calls until the job finishes.

OS/2, however, doesn't make you wait. You can stick a disk in drive A and issue the "format" command, then continue working on a document or spreadsheet. Where the tendency was to stare at the cursor for a minute or two as it changed to and from an hourglass, you can now switch tasks. This time can be spent more "productively," on a spreadsheet or a document or—if your system is connected to a second modem—another upload or download. This will change how you perceive the computer, as you are no doubt accustomed to sitting at your desk and waiting for the PC to finish its job.

13 TIP: A HANDY TASK LIST

Unlike Windows, the OS/2 default configuration doesn't show minimized icons directly on the Desktop. But you can find out exactly what applications are running at any time, one of three ways:

- On the Workplace Shell, click both the left and right mouse buttons simultaneously to call up the Window List.
- From within any application hit Ctrl-Esc.
- Select the Minimized Window object on the Workplace Shell, for an iconic view of all open applications.

Then, to switch to any task from the Window List, double click on the application name. In the Minimized Window object you just double click on the preferred icon.

14 MULTITHREADING ALLOWS APPLICATIONS TO WORK BEHIND THE SCENES

Just as a multitasking PC can run several applications concurrently, an application capable of multithreading can execute simultaneous internal functions. Each function—like printing or spell checking on a word processor—uses a separate "thread." This means that you'll be able to work more efficiently with your application, putting many functions to work for you at the same time. So the repagination of a large document won't cause a work slowdown, as each thread performs its task independently.

Multithreading is especially useful in communications packages, where concurrent functions help to speed the data flow. In fact, an OS/2-equipped machine could send material through one serial connection and receive through another, and still allow another task to be completed.

Imagine a spreadsheet that can recalc and revise at the same time, or a database that will simultaneously update and search. This saves time for users. And multithreading is a valuable tool for developers of all types of application programs.

15 TIP: ENDLESS CLIPBOARDS

OS/2 gives each WIN-OS/2 Full Screen and every OS/2 session its own clipboard. Clipboards can be shared, or made "Public" across the entire OS/2 system to share data between WIN-OS/2 (OS/2's implementation of Windows functionality) and OS/2. Only "Private" clipboards can be used in the current session, but making clipboards Private in WIN-OS/2 Full Screen sessions increases the speed of Windows cut-and-paste operations. Use the Options menu for the Clipboard.

16 UNDER OS/2, YOU CAN BOOT INTO DIFFERENT ENVIRONMENTS

With OS/2's dual boot and Boot Manager features, a single PC can operate two or more operating systems, increasing the range and the versatility of the machine. With Dual Boot, you are given the choice of all options at startup. If you don't respond at a predetermined interval, the machine will start the last operating system used.

OS/2 contains DOS and Windows functionality, essentially providing three operating systems in a single box, so Dual Boot won't be necessary for most users. But in special cases—like a developer who may want to use the same machine for everyday work with OS/2 (operating system #1) and a unique development with XENIX (operating system #2)—the Dual Boot feature could eliminate the need to buy a second PC.

17 OS/2 IS THE INTEGRATING PLATFORM

While you can configure an OS/2 machine to boot into any version of DOS or Windows*, you can run several versions as OS/2 tasks. For instance, you can run a Windows 2.x application as one task and a Windows 3.0* application as another. Or you could run separate windows that support different versions of DOS. This extends the versatility of the machine even further, allowing you to run almost any version of any PC software program that has ever existed.

An incredible value: this support for OS/2, Windows, and DOS applications is all included in OS/2; you don't have to buy DOS or Windows to get it.

18 TIP: FASTER, FASTEST

If speed is important when running DOS or Windows programs, use the DOS Full Screen or WIN-OS/2 Full Screen choices in the Command Prompts folder rather than their "windowed" siblings. The DOS or Windows applications will run faster if they have the screen real estate all to themselves.

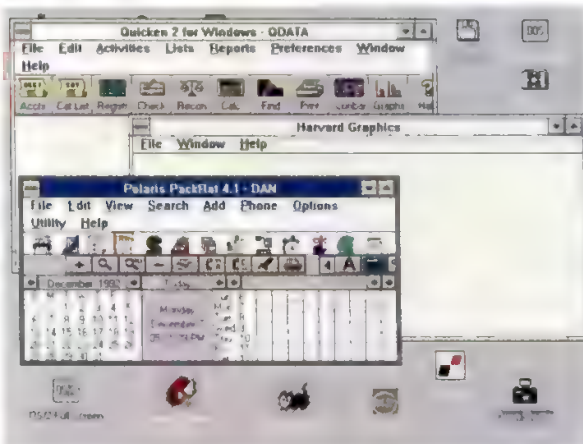
Also, if you have any DOS print spoolers or the Windows Print Manager* installed, disable them. Rely on the built-in, system-wide OS/2 print spooler instead.

19 OS/2 IS BUILT FOR TODAY'S HARDWARE

The evolution of graphical environments has increased the power of the average PC. As a result, OS/2 works on any Intel*-compatible 32-bit processor (386, 486 and above) and will run well on any chip that runs at 16 MHz or higher. As for video, OS/2 looks great on any standard VGA, offering a crispness and clarity that is unmatched by other graphical software, and it takes great advantage of higher-resolution systems.

OS/2 DOES WINDOWS

OS/2 is now the only PC operating system you need to run all of your favorite applications. Now, under the umbrella of the ultra-stable OS/2 environment, you can securely run your favorite Windows applications and utilities.



The OS/2 system, with all options installed, takes up more space than Windows or DOS. Two factors make this less severe than it may sound: The industry-standard PC now comes outfitted with 120 MB hard disks and above. And the full OS/2 installation provides for the complete functionality of DOS and Windows: So 30 MBs actually accommodates three different operating systems, although the OS/2 system can be installed on as little as 15 MB.

20 TIP: THE OS/2 COMMAND PROMPT CROSSES OPERATING SYSTEM BOUNDARIES

The OS/2 Command Prompt, accessible either in a full-screen configuration or in a window, can immediately launch any program regardless of its origin. So you can type a DOS, Windows or OS/2 command, and the system will just load the program. For instance, if you want to launch a word processor like Ami Pro* from the DOS command line, you need to type "WIN AMIPRO." Under OS/2, a simple "AMIPRO" will do.

21 OS/2'S SUCCESS CROSSES BRAND-NAME BOUNDARIES

From IBM Personal Computers to "homegrown" clones, OS/2 is constantly being evaluated for compatibility. This has led IBM to state that OS/2 will work with your Intel 386 SX or higher system—PS/2 not required. OS/2 thrives on any machine with enough juice, be it ISA, EISA or Micro Channel.

EISA and Micro Channel offer great advantages, and both offer performance improvements beyond those available in standard machines. Both are better equipped to handle multiple serial communications devices. And, as they use a separate bus for many tasks, they can be a better environment for multitasking activities.

IBM's hardware compatibility testing checks 18 key functions of OS/2 on a variety of personal computer hardware systems. Compatibility testing extends beyond OS/2 itself and into OS/2 Extended Services, Distributed Database Connection Services/2, OS/2 LAN Server and OS/2 LAN Enabler. To date, over 400 configurations have been verified as compatible with OS/2. Test results on various models are continuously updated and available from IBM OS/2 dealers, as well as through the on-line services CompuServe* and Prodigy*.

22 OS/2 MAKES GOOD USE OF MEMORY

As personal computers continue to take on the tasks formerly in the domain of mainframes and minicomputers, Random Access Memory, or RAM, is another area where more may never be enough. You may need to add memory to your PC to run OS/2 (or even less productive operating systems). A minimum of 4 MBs of RAM is needed for

the system to function, while 8 MB is enough memory for OS/2 to provide the industrial-strength support corporate users demand.

There is no practical limit to the amount of RAM that OS/2 can use, as the system is capable of addressing up to 2 gigabytes of virtual memory and more than 16 MB of physical memory. As graphical applications become more popular, the amount of RAM required for spry operation will increase. In a few years, it won't be uncommon to find PCs with 64 MB of RAM—essentially mainframes on the desktop. OS/2 is ready for this challenge.

23 OS/2'S MEMORY MANAGEMENT GIVES THE USER MUSCLE

Users accustomed to jumping through memory management hoops will be pleasantly surprised by OS/2, as they can take advantage of built-in DOS memory management. Tuck TSR (Terminate and Stay Resident) programs neatly out of the way by using the LOADHIGH command within DOS. If you really want to push the envelope, OS/2 will give each program up to 48 MBs of combined XMS/EMS memory, and up to 512 MBs for each application written to the DPMI specification.

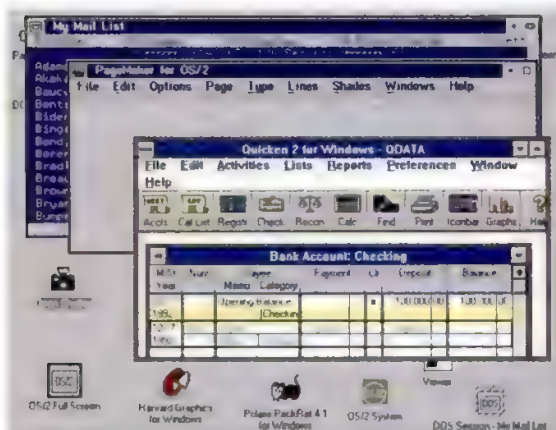
Additionally, OS/2's virtual memory manager treats hard disk space as if

24 OS/2'S MEMORY MANAGEMENT ELIMINATES THE RAM CRAM

One category of software clearly not needed as a supplement to OS/2 is memory management utilities, as they are already an integral part of OS/2's 32-bit architecture.

OS/2 shatters the 640K barrier permanently with its flat, or linear memory model, giving DOS, Windows and OS/2 programs as much memory as they need without breaking the memory into segments. OS/2 can handle memory objects from 1 byte to 4 gigabytes, giving you flexibility at both the small and large ends of the spectrum. OS/2 recognizes and uses all available memory. And you can set up DOS or Windows sessions individually with extended LIMA XMS 2.0, expanded LIM EMS 4.0 or DOS Protect Mode Interface (DPMI) memory.

THE OS/2 100



it were real RAM, limited only by the size of the hard drive. OS/2 silently and quickly swaps out to disk the memory that hasn't been used recently, freeing up real memory for active processes. Because OS/2 manages memory in small 4 KB objects instead of variable 64 KB chunks, memory fragmentation and swapping is reduced, and speed is increased. Rather than getting "Out Of Memory" errors, you get fast, efficient, virtual memory management that makes the best use of your computer resources.

25 CRASH PROTECTION™ IS AN INEXPENSIVE INSURANCE POLICY

Crash Protection is OS/2's way of keeping a single, misbehaved program from converting the entire environment into a gang of delinquents. With Crash Protection, you may have a misbehaved program, but one that's kept in solitary confinement. OS/2 protects system memory from your applications, as well as protecting the applications from each other.

By comparison, when a General Protection Fault (GPF) or a memory violation occurs under standalone Windows, your only recourse may be to reboot. Even if you can continue working by closing the offending program, there is a chance that the violation might come back to haunt you. Under OS/2, each window runs in its own virtual workspace (each workspace is a separate personal computer, as far as memory is concerned). If you get a GPF, only that workspace is affected. All other applications are protected and can continue undisturbed. So a single application failure won't hang the entire system.

OS/2 DOES EVERYTHING

OS/2's ability to run Windows™ is only the beginning. The system also supports DOS equally well, and can run applications from all three environments at the same time—even on the same screen. So whatever PC software you need, OS/2 will bring it to the forefront.

26 TIP: WHEN EVERYTHING STOPS, DON'T PANIC

Occasionally, all activity in a window may come to a sudden halt. Don't reboot—yet. Instead, hit CTRL-ESC (for the Window List). Don't move the mouse or hit any other keys. Wait a minute. While the screen isn't doing anything, OS/2 is investigating what caused the application to freeze in the first place. In most cases, the Window List or an error message will pop up. Or, the application will simply un-freeze after OS/2 has completed its diagnostics. At that point you may choose to close the application or keep working.

27 CRASH PROTECTION WORKS ACROSS DIFFERENT ENVIRONMENTS

OS/2's ability to protect one application from the anomalies of another is a productivity breakthrough, but that's only half of the story. Any program running under OS/2—DOS, Windows or native 32-bit—shares this benefit. For instance, if you were running 32-bit DeScribe*, 1-2-3 for DOS, and Corel Draw* simultaneously, a memory fault that occurs in any one of these applications won't influence the behavior of the others. Furthermore, you can run different DOS applications in separate windows, and they will maintain the same isolated memory use and function (although it is possible to cut-and-paste information between the different programs).

In this case, OS/2 enhances standard

DOS by adding the ability to truly multitask character-based, 16-bit applications. So installing OS/2 offers a clear advantage even if you continue to use the same DOS or Windows programs and postpone the use of 32-bit software.

TIP: OS/2 CAN FIX DISKS

If you actually want to repair your hard disk using CHKDSK, boot your system from a different disk. Use the Installation Diskette that came with OS/2. Insert it in drive A and restart the system. When the IBM logo appears, remove the installation diskette and insert diskette 1. Press ENTER. When the first text screen appears, press ESC. This dumps you into the OS/2 command line. Insert diskette 2. Now, type "CHKDSK C: /F" to run CHKDSK from the floppy. (If C: isn't your hard disk, replace it with the correct letter in the command).

28 THE HPFS MAKES FILE AND DISK MANAGEMENT MORE FLEXIBLE

The High-Performance File System (HPFS) is OS/2's way of making file management flexible. Its benefits are numerous: longer file names, less disk fragmentation, and access to traditional DOS FAT (File Allocation Table) files.

HPFS files can have long names, up to 254 characters including spaces, commas, periods and other punctuation. That's a long way from the 8.3-character FAT naming convention. Your "BDGT1992.DOC" now can be "Company-Wide 1992 Budget, Revision 1.0." The HPFS resists disk fragmentation, leading to higher performance: It's often five-to-ten times faster than FAT. The HPFS also recognizes and reads information created on disks using the FAT file system.

HPFS isn't for everybody. It is at its best on OS/2 systems with at least 6 MBs RAM and a 60 MB or larger hard disk. And if you increase the capabilities of your system, the HPFS will grow with it, supporting storage devices up to 512 gigabytes. The HPFS is an option when you initially install OS/2, or else you can add it later. If you have a larger disk, HPFS is a better choice for managing it.

29 OS/2 HELPS TO TRIM THE FAT

If you prefer not to use the HPFS, OS/2 has an enhanced FAT (File Allocation Table) file system. Sticking with FAT is a good choice if you want to retain two-way compatibility with an earlier version of the OS/2 operating system or DOS. (The HPFS will easily read DOS FAT files, but HPFS information may not be read by systems using FAT.) Or, if you have less than 6 MBs RAM for OS/2, FAT will perform best.

FAT isn't exactly the FAT you're familiar with under DOS. Under OS/2, both FAT and the HPFS read ahead (for sequential I/O), "lazy write" to disk, and accept threshold parameters. The bottom line to these technical features is a faster FAT. So, even if you choose FAT, you've still got OS/2 power and speed working for you.

30 TIP: THE SKINNY ON HPFS AND FAT

If you have no idea whether your OS/2 system is running from an HPFS (High-Performance File System) or FAT (File Allocation Table) partition, the CHKDSK command has the answer. Open up an OS/2 Full Screen or OS/2 Window session by clicking on the appropriate icon in the Command Prompts folder, inside the OS/2 System object. Type "CHKDSK" at the OS/2 command prompt. The first line will tell you whether you're running on a FAT or HPFS volume. You'll also find out how big the hard disk is, how much space is available, and so on. However, CHKDSK won't accurately report any errors, because it's running on the same disk it's checking.

31 300,000 PEOPLE TESTED OS/2 IN REAL-LIFE WORK ENVIRONMENTS

Prior to its release, OS/2 was tested at 30,000 sites by more than 300,000 users. This became the most comprehensive pre-release software test for any operating system or application in PC history, putting OS/2 through stress, usability and performance gauntlets.

Testing continues as every new release is readied. For example, IBM publicly announced the availability of pre-release copies of new versions of OS/2 on CompuServe. Copies were made available to customers who called a toll-free number until IBM distributed in excess of 10,000 betas in little more than a month. IBM answered beta questions on CompuServe, incorporating valuable customer input into the product.

32 YOU CAN AUTOMATICALLY PROTECT THE OS/2 SYSTEM

Afraid of leaving your computer screen open to prying eyes? Part of OS/2's overall emphasis on security includes the Lockup feature. Lockup is a combination screen blanker, screen saver and password protection device.

To activate Lockup from the Workplace Shell, click the right mouse button and choose "Lockup now." Or determine in advance if you'd like Lockup to automatically start after the computer has been inactive for a set amount of time. Lockup will kick in by showing a bitmapped graphic of your choosing (the OS/2 logo and a serene lighthouse ocean landscape are provided), then switch to a floating padlock. No unauthorized entry is permitted, and you can get back to your work by typing in your password.

OS/2 FEATURES A SUPERIOR INTERFACE

33 THE WORKPLACE SHELL PROVIDES A STRONG APPLICATIONS FOUNDATION

After installing OS/2, the Workplace Shell appears with a predetermined selection of tools and folders that will help to familiarize the OS/2

novice with the system's capabilities. For instance, the Drives object offers a fast path to file manipulation, and the Productivity Folder contains a selection of information management and time management tools.

But these are only the beginning. OS/2 has no menu bar, so you have a wide-open space on which to install the objects that you create and applications that you need. And the ability to place folders within folders—on a virtually infinite basis—lets you sort and arrange objects exactly how you work. As a result, the Workplace Shell has the ability to be as comprehensive or as simple as the situation requires.

OS/2 menus also provide a context, offering only the commands that are available from that point in the interface. This gives you a clear idea of the choices available in each situation, and doesn't bog you down with irrelevant commands.

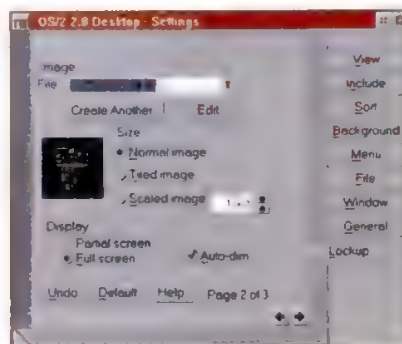
34 THE SETTINGS NOTEBOOK CONTROLS OS/2 OBJECTS

When you click on an OS/2 object and select the "Open Settings" menu sequence, you call up the Settings Notebook. Here, through selecting tabs that represent various categories, you select how this object will behave. The Settings Notebook allows you to easily fine-tune options such as associating files and modifying icons, as well as control window activity.

The Settings Notebook is truly context sensitive; you are only given choices that will directly affect the specific object. For instance, the Lockup settings let you determine the delay before the screen saver begins, pick or add a bitmap image, tile or scale the bitmap image, and enter or change your password. The tab-driven interface makes the choices clear.

DECORATING THE DESK

The behavior of each OS/2 object is controlled through the Settings Notebook. This tab-driven module allows you to customize every aspect of the object, in a way that is clear and easy to understand.



35 OS/2'S OBJECTS ECHO COMMON DESKTOP METAPHORS

Under OS/2, a Desktop object falls into one of four categories:



Config.sys

File. OS/2 further develops the traditional file-as-data-receptacle metaphor. Files hold data and are tied to applications. So a "Memo" created in DeScribe sits on the Desktop, where clicking on the icon loads the file and the application in one step.

Program. This includes standard application programs, utilities and tools. A program object, independent of a file, is positioned on the Desktop for easy access and in many cases controls system functions.



Window Washer

Device. A device qualifies as any peripheral that connects OS/2 with the outside world: A printer, FAX, modem, network or disk drive all appear as Desktop objects. The Shredder—essentially the OS/2 delete command—is also represented in the same way.



Shredder

Activating a device object is simple and straightforward: You highlight the file and drag it over the device to execute the command. Where appropriate, a dialog box appears to confirm the command.

Folder. The OS/2 folder acts like its analog counterpart, containing several disparate parts that all relate to the same subject. It may contain a combination of files, programs and devices, all pertaining to a single task or project. You can also install a folder within a folder (or an object within a folder) to build a hierarchical series of objects.



Games

36 OS/2 TEMPLATES SET THE STAGE FOR CUSTOMIZED DATA ENTRY

The OS/2 Templates folder, installed with the Workplace Shell, allows you to instantly create objects and install them on the Desktop. Any item in the OS/2 Templates folder can be highlighted, dragged to another location, and opened as a custom file, where it becomes the appropriate database, spreadsheet or document for data entry.

In addition, many OS/2 applications place a custom template into this folder during installation. For instance, to create a memo you may highlight the DeScribe Template and drag it to the Desktop or into a new folder. Then, Alt-single click on the title and modify it accordingly. It's much like a pad of paper, where you tear off one sheet at a time. Under OS/2, each sheet of "paper" harnesses all the full power of the operating system. So instead of a pad of paper you can have a pad of spreadsheets.

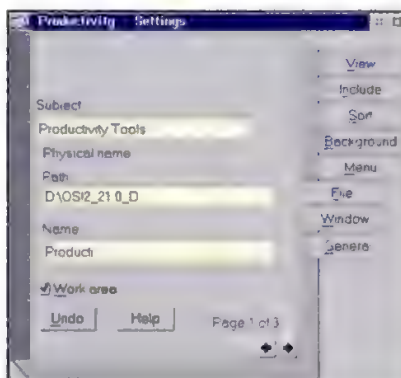
37 WORK-AREA FOLDERS KEEP YOU ORGANIZED

Keeping track of information and programs related to a project is simplified with work-area folders. A work-area folder looks like any other folder object, but the biggest difference is that anything you keep in that folder is closed and saved whenever you close the folder. And, when you reopen the folder, everything in it is restored to the view in effect when you closed it. So, OS/2 works along with you.

Imagine a project which includes several reports, a spreadsheet, and a printer with custom settings. All can be kept in a work-area folder, always opening to the view in effect when you last left the project. If you hide or minimize the folder, everything in it hides or minimizes at the same time. When you show the folder, everything reopens. One example of a work-area folder

GROUP YOUR FILES LOGICALLY BY PROJECT

With OS/2's Work-Area Folder option, you can easily group files and applications that pertain to a specific project by using the Settings Notebook.



is the OS/2 Desktop itself. The Desktop is actually a work-area folder which remembers object placement and open objects whenever you close the folder by shutting down.

Create a work-area folder by clicking the right mouse button on a folder, choosing Open, then Settings, and then the File tab. Just click "Work area" and the folder is now a work-area folder object.

38 THE WORKPLACE SHELL IS A GREAT ORGANIZER

The Workplace Shell is more than a digital desktop from which you launch computer applications. The most significant difference between Workplace Shell, the touchstone of OS/2, and the controlling interfaces of other operating systems is that it is completely customizable. There are no fixed objects in the Workplace Shell. You can easily add or delete any system or program function and include as many or as few commands on the Desktop as you wish.

Furthermore, almost all aspects—fonts, colors and icon arrangement—are easily customizable, with a minimum of reference to documentation. In most cases, these changes only require a simple drag-and-drop command.

More significantly, the Workplace Shell is completely object oriented—each Desktop object offering a direct path to a file, program, device or folder. This brings a real-world metaphor to the computer Desktop, as every object on an office desk falls into one of these categories.

Everything within OS/2 has a frame of reference to the "real world." And like your own desk, access to the contents of the object is immediate. You don't need to issue commands to load a program or open a file in order to access the object's contents. (Similarly, you don't need to say things like "Alt-File-Open-Budget" to open a paper folder with a spreadsheet inside.)

39 TIP: THE ORGANIZATION DESKTOP

If you have a lot of windows open and need to get something from the Desktop, it takes time to hide or move all the windows. Make the Desktop accessible by making a copy of it in a window. Then, you can use the Window List (CTRL-ESC) to select the copy and bring it to the top. First, click the right mouse button on the Desktop background, choose Open and Settings. In the Settings Notebook, choose the Window tab. In the "Object open behavior" area,

click "Create new window." Close the Settings Notebook.

Now, open a copy of the Desktop in a window from the Desktop itself. Click the right mouse button on the Desktop background, and choose Open and any view you desire (Icon, Tree or Details). You can dismiss the new Desktop window at any time in the same way you'd close any window. Conveniently, you can arrange the icons in the window into a view that's best for a particular task, and a copy of the Desktop can be in Details view while the normal Desktop itself reflects icon view.

The Minimized Window Viewer offers an icon view of all open applications. You can also get a task list with a simultaneous left/right mouse click anywhere on the Desktop.

The upper left-hand corner of every window contains the program icon for the active application. This gives each OS/2 window an individual nature and offers an immediate visual clue about the window.

Hide, Minimize and Maximize commands are part of every OS/2 window. A single click on the small square hides the application but keeps it active. A single click on the large rectangle toggles between full screen and windowed size.



The shading on a Workplace Shell object indicates that the application is currently active. A double-click motion accesses the open copy of the object directly.

OS/2 allows objects and folders to be nested within other folders. As you progress from one folder to another, each is automatically cascaded on the Workplace Shell surface.

OS/2 menus provide all the choices available for a particular object, along with the context. Here, the menu commands control the area within the dotted line.

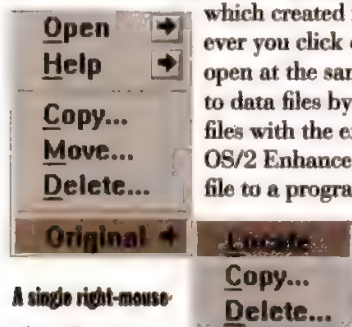
When a device object is represented anywhere on the Desktop, you can drag-and-drop another object to execute a function. Dragging a file over the shredder object would delete that file.

40

OS/2'S ABILITY TO LINK FILES AND APPLICATIONS BUILDS A DIRECT PATH BETWEEN THE USERS AND THEIR DATA

OS/2 makes it easy to connect data files with the appropriate application. You can create this link directly, or even make "shadow" copies, where icons in different places link to the same object. Either way, a single double-click will open both your file and the program you need to run it, ending frustrating minutes of trying to remember which application created which bit of information.

OS/2 does this by creating an association between a program object and data-file objects. You can associate files to programs in three different ways. The first ties the type of file (e.g., a spreadsheet data object) to the program which created it (e.g., a spreadsheet application). Whenever you click on the file, it and the spreadsheet program open at the same time. The second links a program object to data files by a part of the file name. For example, all files with the extensions DOC or TXT could launch the OS/2 Enhanced Editor. The third way associates a single file to a program name by listing the program as an option on the data file's Open menu.



A single right-mouse-click calls a pop-up menu, which offers the available options for a link to another file, application or folder.

A way to maintain access to an object from multiple areas without duplicating the object itself, is to use OS/2's shadows. And, when you manipulate information in a shadow, the information in any other shadows and the original is also changed.

TIP: ME AND MY SHADOW

Instead of using the object's menu to make a shadow, simply press Ctrl and Shift while you click and hold the right mouse button. Drag the object to any folder and release the mouse button. Voila! A shadow appears!

41 OS/2 HAS STYLE

It's easy to personalize OS/2's interface to reflect your own taste and style. The primary tools to do so—tools controlling color and fonts—are in the System Setup folder within the OS/2 System group... just four mouse clicks away from the Workplace Shell's opening screen. Here, you give each window, folder and object its own color and font scheme and bring a new level of personality to the Desktop.

With the Color Palette, you select the desired hue with a single right-button click, at which point the cursor changes into a paint roller dripping with that shade. You drag the cursor to the destination—a window, menu or Desktop—and release. The color changes instantly. Similarly, to modify the font on any menu or window, you highlight a type style on the Font Palette and drag it to the target.

The Scheme Palette allows you to customize colors and fonts for individual windows or across the system in one action. The described Color Palette and Font Palette actions only affect the target windows, or you can hold the Alt key to make the modification work universally.

IN LIVING COLOR

Both the OS/2 Color Palette and Font Palette allow you to customize visual preferences. A drag-and-drop action changes these aspects in one program or across the system.



TIP: THE UNIVERSAL DRIVER

Thinking of changing mice and don't know what mouse driver to select? OS/2 intelligently detects and installs the correct mouse driver. So don't worry if you're not prompted during installation for your mouse type—OS/2 has sensed it and installed a driver which works.

42 THE OS/2 MOUSE OFFERS SHORTCUTS TO POWER

While OS/2 provides several convenient keyboard shortcuts, the heart of user interaction with the system comes from that trusty denizen of the digits, the mouse. It is the mouse, in fact, that gives the user complete control over OS/2 commands, in a powerful, intuitive way. Nevertheless, using the OS/2 mouse involves more than just point-and-click.

In addition to drag-and-drop, the right mouse button brings up a context menu, allowing you the choices that are available from that point in the interface. Another universal OS/2 mouse command is the simultaneous left/right single click anywhere on the Desktop, which brings up the active Window List.

These options can be customized through the Mouse object in the System Setup group. Here, you adjust the mouse for left-handed or right-handed operation to suit your style, or remap different buttons to drag-and-drop, or call up the Window List. You also determine the combination used to change the Desktop title. (Alt-left button is the default.)

43

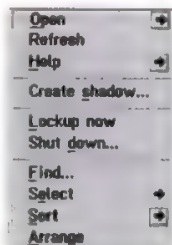
POP-UP MENUS GIVE
USERS CLEAR CHOICES

Pop-up menus show exactly what you can do at any given time.

Clicking the right mouse button anywhere on the Desktop opens a pop-up menu, which controls the most important Workplace Shell

functions. Besides the ability to arrange and sort all Desktop objects, this menu controls password lockup and shutdown. Like other OS/2 menus, this feature shows only the choices that are available from that point in the interface.

You can add choices to the Workplace Shell simply by modifying the pop-up menu.



TIP: CHANGE THE CHOICES

OS/2 allows users to change the context and add choices to the menu. For instance, you may want to add file search capabilities, so you would do the following:

1) Open the Settings Notebook and select the Menu Page.

2) Click "create another" below the primary pop-up menus field. Type the menu item name, path and filename (in this case, C:\OS2APPS\PMSEEK.EXE) of the desired application into the pop-up dialog box.

3) Close and exit. The program then appears on the bottom of the system menu.

These modifications are reflected only in the individual menu, so if you change the choices in the Drives window, it doesn't affect menus anywhere else on the Workplace Shell.

44

TIP: POWER TO
THE KEYBOARD

If you want to select an object on the Desktop without having to "mouse around," type the first letter of the object (e.g., "O" for OS/2 System) and you'll jump right to that object. If there's more than one object that begins with the letter (e.g., "M" for Minimized Window Viewer or Master Help Index), typing the first letter repeatedly will go to every object that begins with that letter. Then, hit ENTER to open the object.

tions. Ctrl-right mouse button makes a copy of any file or object, which can be moved to any folder.

46

TIP: UNTRAPPING
THE MOUSE

If your mouse disconnected or died sometime during an OS/2 session, don't panic. Press CTRL-ESC to bring up the Window List. Use the arrow keys or type "O" to select the OS/2 Desktop, and press ENTER. Hold down CTRL and the \ key to de-select any selected icons. Finally, Press SHIFT-F10 to bring up the Desktop menu, and use the arrow keys or type "D" to shut down.

47

THE OS/2 SHUT DOWN
COMMAND PROVIDES A
VIRTUAL BOOKMARK

Many users, when they are finished with their work, are inclined to just save the current files and turn off the computer. Under OS/2, it's better to use the Shut Down command (part of the Desktop Menu, accessed through a right-button mouse click on the Desktop) to save all open objects, folders and programs. Following this, it offers the option to save or abandon changes in a DOS or Windows session. At the next startup, everything goes back to where you were. This extends the comparison to a standard desk: When you come to the office in the morning, your desk looks the same as the night before.

Some of today's computing envi-

45

THE OS/2 MOUSE
IS AN ARTFUL
DRAG-AND-DROP TOOL

OS/2 relies on the right mouse button to complete drag-and-drop commands, allowing you to control objects in an intuitive way. You highlight a file or an object with a single right-button click, then hold the button down and pull it to the desired location: Inside another folder, to a device or onto the Desktop. Releasing the button executes the function.

Drag-and-drop isn't restricted to a single item. If you highlight a file or object with the left mouse button and drag it across another file or object, this highlights both items and allows you to execute a single function like print or shred.

Mouse/key combinations also help to execute the drag-and-drop func-

SIMULTANEOUS

Brings up window list from anywhere on the desktop

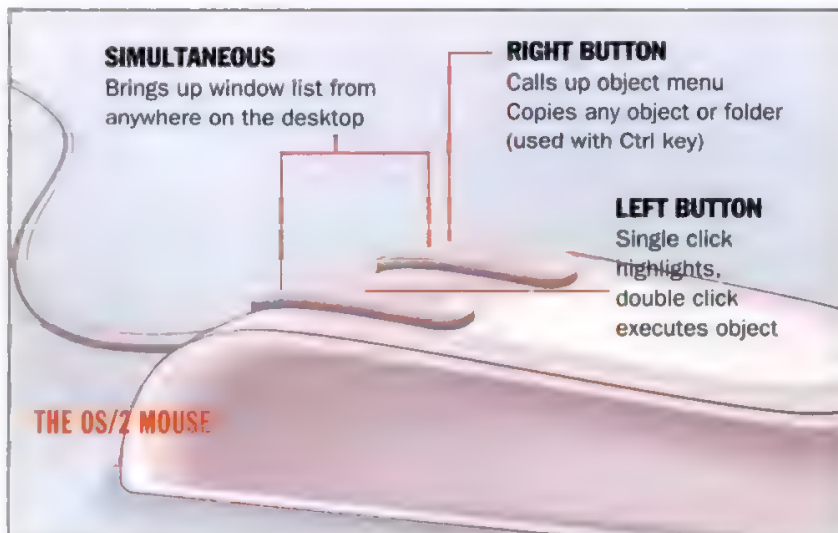
RIGHT BUTTON

Calls up object menu
Copies any object or folder (used with Ctrl key)

LEFT BUTTON

Single click highlights,
double click executes object

THE OS/2 MOUSE



ronments require around-the-clock operation, so you may only use Shut Down if you want to move the system, add expansion cards or turn the computer off. Turning off the power in the middle of an OS/2 session may damage the PC's initialization files and corrupt the Desktop, even if all of the files are saved.

48 TIP: CLEAN YOUR DESK

To start with a clean Desktop at startup, hold down the left CTRL, left SHIFT and F1 keys simultaneously from the moment the mouse pointer appears until icons are displayed on the Desktop. This will disable automatic restart for the current session only.

Another method is to add a line to the CONFIG.SYS file. Use the System Editor or Enhanced Editor (in the Productivity folder under the OS/2 System object) to open CONFIG.SYS. Add the line: SET RESTARTOBJECTS=STARTUPFOLDERONLY. Save the file and reboot. It'll keep disabling the automatic reloading of open applications, except those in the Startup folder.

OS/2 COMES EQUIPPED WITH EVERYTHING YOU NEED TO GET STARTED

49 OS/2 ARRIVES WITH A HANDFUL OF ESSENTIAL UTILITIES

Right out of the box, OS/2 provides well-thought-out adjuncts to a fully functional operating system. With the included "applets," IBM is priming the pump with a range of utility programs, which demonstrate the 32-bit environment in graphics, communication, system and time management areas.

Included as part of the Productivity Folder in the OS/2 System group, OS/2's applets help to acquaint you with the OS/2 interface and menu structure as you complete these tasks. For instance, you can change the font size and the color of any of the OS/2 applets, or control the menu typefaces with the font palette.

TIP: YOU CAN CUSTOMIZE THE LOOK OF ANY OS/2 APPLET

Every OS/2 applet has a Customize menu item, which lets you to select the colors of program components and the font size: From a tiny 10 x 6 to a commanding 10 x 22.

50 OS/2 INCLUDES A SPREADSHEET AND A DATABASE

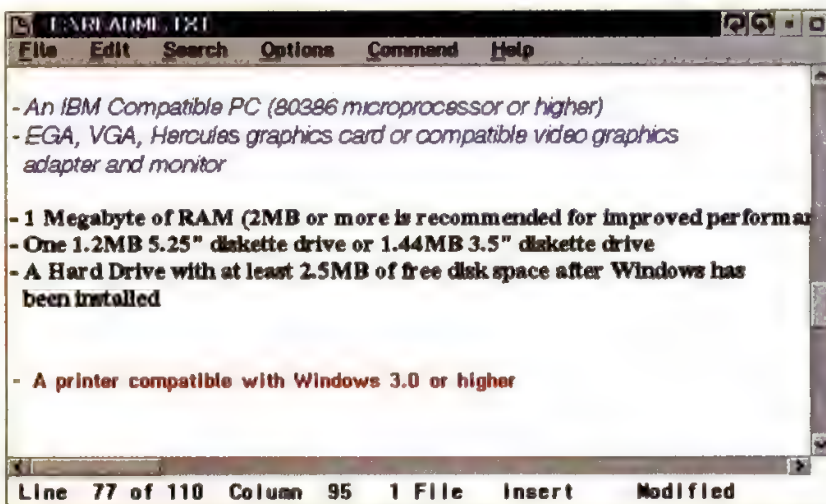
Ten years ago, the spreadsheet and database included in OS/2 would have been sold as stand-alone applications. The 26 column x 40 row spreadsheet allows you to track monthly expenditures, sales figures or any other numerical data. You can also write and execute simple formulas.

The OS/2 Database allows you to create up to eight fields and is ideal for the maintenance of phone lists or simple data projects. Each database can contain up to 5,000 records and includes a built-in telephone dialer (accessed with the Ctrl-D command).

51 OS/2 HAS TWO BUILT-IN TEXT EDITORS

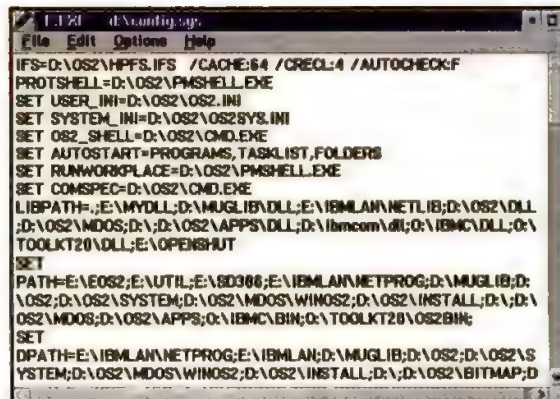
OS/2 includes two text editors, one for editing and creating text files and another for programming and light word processing. The System Editor can create and edit CONFIG.SYS and AUTOEXEC.BAT files. It's also a convenient tool to display other text files or perform basic editing tasks. You can start several versions of the System Editor so you can edit several files in separate windows. System Editor easily handles text files up to 32 KBs in size.

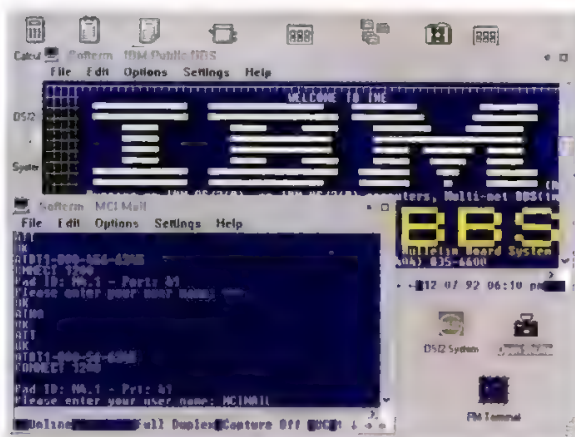
The Enhanced Editor takes text editing several steps further. You can work on multiple files at the same time. It runs from a menu or command line. Text is drag-and-droppable under Presentation Manager. You can record and playback keystrokes, choose the font and font attributes, automatically save files after a number of keystrokes, and use it as a Presentation Manager platform for running REXX programs (see #59).



OS/2 HAS TEXT APPEAL

The OS/2 system includes two text editors. The System Editor (top) handles files of up to 32 KB, and is used for editing system and .BAT files. The Enhanced Editor (bottom), with font support and drag-and-drop text, can be used for light word processing chores.





52 A TERMINAL PROGRAM CONNECTS YOU TO AN OUTSIDE 32-BIT WORLD

PM Terminal is OS/2's built-in way of getting you hooked up to online information services and other personal computers with your PC's modem.

PM Terminal, in technical terms, handles asynchronous communications and terminal emulation using the OS/2 Workplace Shell. This lets you communicate with other computer systems and transfer information. When you launch PM Terminal, you'll find it comes configured with a variety of profiles for CompuServe, GEIne, IBM's own OS/2 bulletin board system, and other services. These profiles are easily changed, or you can add your own (perhaps to hook up with a local computer bulletin board system or a friend's personal computer). PM Terminal also lets you record frequently used keystrokes as macros.

TIP: ICON BE CREATIVE.

While running a DOS graphics program in a window, use the graphics cut-and-paste feature to clip a picture and paste it into the Icon Editor. You can then quickly and easily create customized icons for all of your applications.

TALKING BACK

OS/2's PM Terminal is a good introduction to 32-bit telecommunications. It comes pre-configured with protocols and numbers for the most popular online services, and allows you to upload or download large files in the background while working on another task.

53

BUILT-IN DISK CACHING SPEEDS ROUTINE OPERATIONS

Routine disk read and write operations take time and decrease responsiveness. OS/2 deals with this by including disk caching as a standard feature. As disk operations typically are the slowest aspect of computing, executing as many functions as possible in memory will speed overall operations.

Furthermore, a cache reduces wear and tear on your disk because the CPU is not going to disk as often.

OS/2 automatically selects the size of the disk cache when you install the operating system, based on your installed memory, disk size and file system (the default for a system with 4 MBs RAM is 128 KBs). However, you can adjust the size of the disk cache after installation by using the DISKCACHE command in the CONFIG.SYS file.

54

OS/2'S STICKY PAD HELPS TO MANAGE RANDOM INFORMATION

One of the most popular and useful DOS utilities was the

Sticky Pad, a way to capture the random information that makes every business day confusing. OS/2's embedded Sticky Pad, located in the Productivity Folder, has none of the irregularities of the DOS-based memory resident programs. Instead, it looks just like the pad you put on your refrigerator. You can write a new note and "tear" it off (through a drag-and-drop motion) and place it on the Desktop.

With the Sticky Pad, you can enter any information—text or numeric—before deciding to which application it belongs. After that time, you highlight the text and copy to the clipboard, and then paste it into the appropriate application. Or you can minimize individual notes on the Desktop, where they are indicated as small numbers across the bottom of the screen.

55 A CHARTING PROGRAM TAPS THE GRAPHICS POTENTIAL

PM Chart has a variety of drawing and charting tools to ease the creation of business graphics. And it comes free with OS/2.

PM Chart has a worksheet for entering data you want to chart. Charts (and other functions) are chosen from icons on a tool bar. You can present your data in a variety of chart types including area, bar, column, line, pie, exploded pie and table, with options for legends and 3D perspective. For

drawing, PM Chart can import and manipulate clip art, create arcs, rectangles, ovals, lines and freehand objects, and align objects. In addition, charts and drawings can be annotated with text, printed and copied to OS/2's clipboard.

56 OS/2'S TUNE EDITOR IS AN INSTRUMENTAL UTILITY

The OS/2 Tune Editor allows you to create and edit tunes to be used with the Alarm utility. You can write, edit and play up to 36 individual tunes of up to 20 notes each. Four sliding bars adjust for value, note, tempo and pitch, and you can work on either the bass or treble clef (although the Tune Editor can play only one note at a time). And you can tie these sounds to any Alarm reminder to keep you on schedule.

The possibilities are virtually endless: You can open each computing day with "Reveille," and close with "The Minute Waltz"... or be considerably more imaginative and create your own compositions.

TIP: A 32-BIT REMINDER

Need a reminder to back up your hard disk? How about launching the backup program automatically? OS/2's built-in Alarms application is just the tool. Choose "Set Alarm." In the Comment line, type the name of the .EXE or .COM file you want to launch (with the complete path, if it's not in the same subdirectory as Alarms). Choose the day, hour, minute and other settings, making sure you check the "Execute comment as command at Alarm time" box. Click on the Set button. Close the Set Alarm window, and hide (don't close) the Alarms application. (If you close it, the Alarms don't function). When the appointed hour arrives, your application will launch.

57 A BUILT-IN SEARCH CAPABILITY HELPS FIND LOST FILES

With the average hard disk exceeding 100 MBs, it becomes impossible for users to remember what information is in which file. Therefore, one of the most popular and useful add-in utilities in the DOS environment is Text Search, where users can instantly comb a disk for a certain phrase or data string. Under OS/2, Text Search is a system-level utility (Seek and Scan Files, in the Productivity Folder of the OS/2 System group), that is fast, thorough, and, best of all, included at no extra cost.

The program is simple and straightforward: You type in the files to search, such as *.DOC, a text or numerical string of any length, and the drives to search. After a few seconds, the files that contain that string will appear in the "Files found" window. You can then open the file by dragging the file name and dropping it upon the Enhanced Editor icon (as long as the Enhanced Editor is loaded).

MATCHLESS BATCHES

Users with a minimum of programming knowledge can streamline their computing routines with OS/2's REXX procedure. This produces powerful batch files to execute complicated, automated functions.

58

AND GAMES ARE INCLUDED

One of the most popular Microsoft Windows applications is the Solitaire game that is included with the system. OS/2's version, Klondike Solitaire, leads the pack of the included games. This includes two puzzle games, a graphical chess game and Reversi, the popular strategy game that is no longer available under Windows.

OS/2 games provide a way for you to have fun with the system, practice your "drag-and-drop" technique, and take a break from the routine. In between spreadsheet recalcs, for instance, you may want to fit in a round of chess against the computer. Or you can squeeze in a few games of Solitaire during a download.

TIP: PLAY CAT AND MOUSE WITH THE CURSOR

If you have trouble seeing the mouse pointer while using a gray-scale or monochrome monitor built into a laptop PC, there's a remedy. The most visible—and fun—is to go into the Games folder (in the OS/2 System object). Double-click on the Cat and Mouse object. Now, hide the Cat and Mouse program by clicking on the appropriate box, so Cat and Mouse keeps running while you're working.

An animated cat will chase your mouse pointer across the Desktop, compensating for the invisibility of the cursor caused by rapidly moving the mouse. (The cat will even follow the mouse pointer behind open windows.)

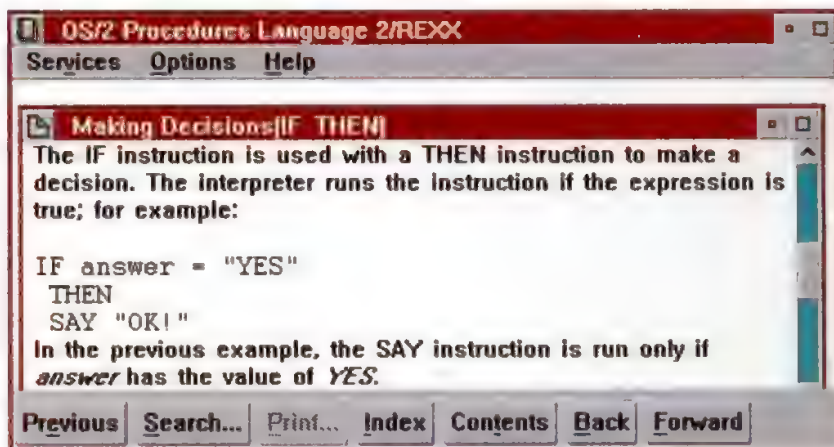
(Cat and Mouse is actually designed as a tool to teach you to use the mouse. It's easy to disable when you get tired of it. Just click CTRL-ESC to bring up the Window List, and click on Cat and Mouse. Either close the window by double-clicking in the upper left hand corner, or, under the Actions menu, choose "Disable cat.")



59 OS/2 HAS A POWERFUL SYSTEM-WIDE PROCEDURES LANGUAGE

If you've ever written DOS batch files to automate functions, you know how convenient they can be. But they can also be frustratingly limiting. OS/2 breaks through batch file limits with its REstructured eXtended eXecutor (REXX), a powerful procedures language. REXX got its start on mainframes, and all of its power is now

part of OS/2. And it's accessible power. REXX lets you produce what you might think of as a super-batch file. However, it uses common English words and a natural syntax flow which both beginning and experienced programmers can understand. Existing batch files can be converted to REXX procedures, adding power and function. REXX instructions don't need to be compiled: Just create a command (.CMD) file, and you're done.



TIP: THE FIND COMMAND HELPS YOU PREPARE

The Find function, on the main menu of the Workplace Shell, takes text search to the next logical step. You type the text that you need, such as "Budget," and direct the program to search all folders. It then creates a new folder that contains all the file objects that contain the word "budget." So if the boss asks to see all the budget file, they are but a few keystrokes away.

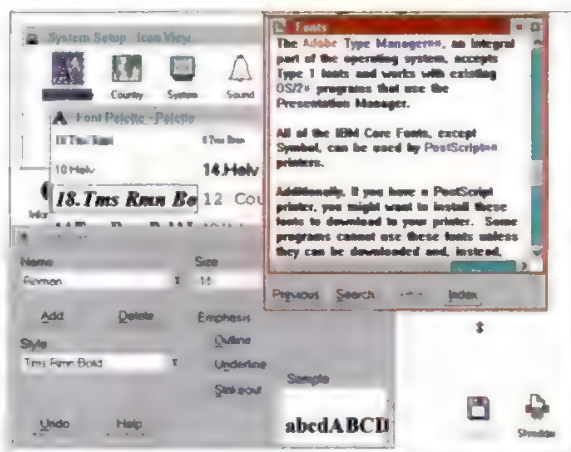
OS/2 IS A SUPERIOR APPLICATIONS PLATFORM

60 OS/2 IS A NATURAL ENVIRONMENT FOR PORTABLE COMPUTING

Multitasking is a necessary feature on the desktop, but it can be absolutely essential on the road. The major multitasked functions for OS/2 computing will be printing and communication, used in conjunction with your primary application. On the road, when both time and battery life are at a premium, you don't want to spend many minutes staring helplessly at the screen while the computer sends and receives a large file. So with OS/2, you can be downloading one message as

JUST YOUR TYPE

Adobe Type Manager, the font technology favored by design professionals, is part of the OS/2 system. Combined with OS/2's convenient drag-and-drop fonts, ATM adds real type flexibility.



you respond to another.

OS/2's ability to multitask communications and other applications makes it a natural for portable computing, especially since most of today's new notebook computers have the power to run the system at peak efficiency. As OS/2 evolves, IBM will continue to add exciting capabilities that will enhance portable computing.

62 OS/2 PROCESSES WORDS WITH FLAIR

Pundits once thought that word processing, of all the major applications, would benefit least from 32-bit power. Not true. A capable 32-bit

word processor, DeScribe, is already on the market and market leaders WordPerfect*, Computer Associates and Lotus* intend to enter the category in 1993. Some of the advantages are obvious, like the ability to print one document while continuing to work on another. Others are more subtle: DeScribe interacts with the Workplace Shell, and allows you to drag a document icon onto the INSERT icon to enter that document's contents into an open DeScribe file.

This process allows corporations to create

63 OS/2 INCLUDES ATM, FOR STATE-OF-THE- ART TYPE MANAGEMENT

OS/2 is also the only PC operating system to include Adobe Type Manager* (ATM) as part of the system software, without requiring the user to buy or install another type package. ATM (included here for both Windows and OS/2) is the font management technology that's been adopted as the standard by designers for sharp on-screen type rendering. This makes it easier to kern type and change leading. ATM also speeds printing of heavily formatted documents.

lengthy "boilerplate" documents, invoices, statements, etc., and easily insert them in whatever order fits the situation.

64 OS/2 PUTS MORE PUNCH INTO GRAPHICS

Better performance, more color and greater productivity turn OS/2 into the best environment for creating graphical output.

The coming OS/2 32-bit graphics engine will be enabled to support up to 16 million colors, so designers and illustrators are no longer limited by computer color technology. OS/2 will redraw a large file or save it to disk as much as 25% to 30% faster. Even manipulations of complex images occur more quickly. And the OS/2 multithreading capability means that users can print large graphics files in the background while working on another image in the foreground. OS/2 transparently manages the complexity so users can be more productive.

61 WITH OS/2 SPREADSHEETS, COMPLEX CALCULATIONS DON'T STOP EVERYTHING

A spreadsheet may seem mundane, but it only takes the OS/2 multithreading capability to make it more interesting. For example, Lotus Development Corporation's 1-2-3 for OS/2 uses multiple threads to make resource-intensive procedures run in the background. 1-2-3's Solver utility is used to perform complex optimizations that may involve many variables and may take as long as ten minutes to run. With the DOS versions of 1-2-3, the user must stop working in the spreadsheet while Solver performs a task. But with the OS/2 version of 1-2-3, Lotus has given the Solver its own thread. This means that a Solver process can run in the background while the user continues working with 1-2-3. And printing runs as a separate thread, so it won't slow you down.

65 OS/2 DATABASES CAN SPEED OPERATIONS BY HALF

As personal computers become more powerful, database management systems are required to manage larger, more complex databases. But no matter how powerful the hardware, database performance is ultimately determined by the underlying operating system. Getting 32-bit performance out of a DOS database, for example, requires extender technology and extenders impose a significant performance penalty. Because OS/2 is a 32-bit, multitasking operating system, OS/2 database management systems can provide extremely fast processing of large databases.

Suppose, for example, a user needs to perform a join on two tables, each of which holds several rows. With a DOS database, data in each table would need to be read sequentially before the results could be returned. With a multithreaded OS/2 database, concurrent threads could read each table simultaneously, before combining them into the join and returning the results. This capability reduces the time required for the join by as much as 50%.

66 OS/2 IS A LIVELY SHAREWARE PLATFORM

The shareware market, which allows users to "try before you buy," has a large, rapidly growing set of useful, engaging and fun OS/2 programs—all available for download from bulletin boards worldwide. Logging onto a BBS, in fact, may be the best source for interesting icons, bitmaps, screen savers and games under OS/2. And under OS/2, you can continue to work during the download.

In addition, you can also find business-based utilities and system accessories in shareware outlets. For instance, JP Software's 4OS2 is an alternate command processor that strengthens the OS/2 command line. (The company also makes the popular 4DOS.)

TIP: EXPLORE THE WORLD OF OS/2

If you want to log on to an OS/2 related BBS, find a file with **OS2WORLD** in the title, for example **OS2WOR.ZIP** on CompuServe. You'll get a list of OS/2 BBS's worldwide.

OS/2 IS A SUPERIOR NETWORKING PLATFORM

67 EXTENDED SERVICES EXTENDS YOUR COMPUTING POWER

To supplement OS/2 on a standalone PC, IBM offers the Extended Services package. This expands the power of OS/2 over your local area network (LAN) with two powerful software packages: IBM's Communications Manager (an SNA gateway) and IBM's Database Manager (which can also be used as a standalone system). Extended Services gives you the power to access remote files, communicate with outside information services, and record transactions—all at the same time. Use it to support peer-to-peer networking operations and distribute computer processing demands. Even work with applications across environments that have different connectivity, communications protocol, operating system and hardware requirements.

Ultimately, OS/2 Extended Services makes it easy to link your PC to needed information.

68 COMMUNICATIONS MANAGER HELPS TO MAKE THE CONNECTION

Getting information from one PC to another computer in an office—or around the world—can be a daunting task. Communications Manager provides a "no barriers" approach to accessing this data on compatible mainframes, minicomputers and personal computers.

Communications Manager links you to a variety of IBM and non-IBM applications running on host computers. It does this by emulating ASCII, IBM 3270 and IBM 5250 terminals. Since OS/2 is a multitasking operating system, you can simultaneously transfer files to and from several different hosts. The peer-to-peer communications capabilities let different OS/2 workstations on a network share resources and tasks. Support of the Network Device Interface Specifica-

tion allows you to pick the best network interface card for your hardware from a variety of manufacturers. It also allows you to connect to multiple hosts off a single card.

69 DATABASE MANAGER MAKES INFORMATION COUNT

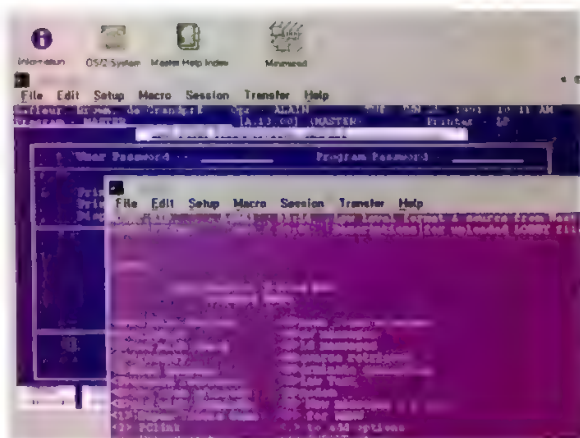
Database Manager adds standalone database functionality to your OS/2 workstation. It is a relational database with SQL (Structured Query Language) compatibility, letting it speak the language of IBM host data management systems like SQL/Data Systems and DATABASE2 (DB2). Issue SQL statements, commands and utilities directly from the OS/2 command line. Or it can use a friendly graphical interface for querying, reporting, data entry and editing, and creating tables. Even DOS and Windows applications can get information from OS/2 Database Manager databases, with no need to learn SQL syntax to access, update and administer data.

If you want to put network database information in a central location, look to the optional OS/2 Extended Services with Database Server. Database Server acts as an information host for the Database Manager clients on your network. It provides OS/2, DOS and Windows client applications access to remote OS/2 database servers, making it seem as though the data hosts were managing the information right at your desk. Plus, it has all the features of the regular Extended Services package.

70 OS/2 STREAMLINES HOST ACCESS

In the complex computing environments found in large, multinational corporations, personal computers frequently need to access multiple hosts. OS/2 was designed to simplify and stabilize the process of sharing data among diverse computing systems.

Because PC-to-host communications are frequently incorporated into important business applications, a protected system is vital. OS/2 provides a stable communications environment, protecting the PC-to-host connection from the failure of other applications.



BE MY HOST

OS/2 allows you to use one PC and one Token-Ring card to connect to multiple hosts. Outside View (Crystal Point Inc., Bothell, WA) emulates five different terminal protocols and supports multiple sessions and simultaneous file transfers. In this illustration, a PC is connected to two hosts.

71 MULTITHREADING ADDS VALUE TO HOST ACCESS

Because OS/2 employs multiple threads, OS/2 communications programs can efficiently access several hosts at the same time. For example, a user can download large files via high-speed modem in the background, while working within an E-Mail program in the foreground.

OS/2 simplifies communications by providing the richest set of communications APIs of any system, with APIs for TCP/IP, X.25, asynchronous and other access methods. OS/2 also provides a cohesive communications environment by supporting common networking topologies, including Ethernet* and Token-Ring.

73 TIP: OS/2 SPEAKS THE LANGUAGE OF THE "HOST"

OS/2-based communications programs can automate many host activities. For example, some OS/2 products make it easy to automatically print Office Vision/VM (PROFS) messages. These products can also automatically notify users when a new piece of Office Vision/VM mail arrives. Because OS/2 is part of the overall IBM corporate computing architecture, OS/2 communications products can simply and easily connect to the existing host-based network.

72 OS/2 PROVIDES COMMUNICATIONS CONTINUITY

This rich group of features is used in Software Corporation of America's TalkThru* RF/3270 Server. TalkThru uses the OS/2 X.25 API to pull in data from remote devices. It then uses the OS/2 Logical Unit Application API to hand off the incoming request to an SNA network and await a response. This provides 3270 communications capability on a single-station basis (LU to LU), eliminating the need for remote cluster controllers. (These advanced features are part of OS/2's Communications Manager)

With OS/2, corporations can communicate across their computing environment, with security and stability.

74 OS/2 GIVES NEW POWER TO VERTICAL APPLICATIONS

Vertical applications, programs that meet the specialized needs of a particular industry, have found a home on OS/2. All of OS/2's advantages—multitasking, multithreading and memory protection—have magnified importance when an application does not have the user base or breadth of support of a standard business program.

Many vertical applications require the constant updating of data across both local-area and wide-area networks, with one or more network servers forming the hub for these transactions. OS/2 was designed specifically for this. It supports both database-oriented client-server computing and easy connectivity with host computers and other LANs. And the easy upgrade path lets all users have the latest software.

75 OS/2 OFFERS PROTECTION THROUGH THE SERVER CONNECTION

Because OS/2 is designed from the kernel up to support client-server computing, corporations are finding it easier than ever to quickly and efficiently deliver data to users anywhere in the PC enterprise. And with OS/2, it doesn't matter where the data resides, what kind of system it is using, or what kind of network is used to gain access.

There are good reasons why OS/2 has been chosen as the basis for many of the most powerful networking systems in place today. First, OS/2 provides a protected-mode, multitasking environment on a PC server. With traditional, unprotected network operating systems, if any server application attempts to use memory inappropriately, there is a good chance that all applications running on that server may crash—bringing the entire system to a halt.

Superior protection then becomes a major OS/2 advantage. If a company is expecting to rely upon its servers, it cannot sustain its business for very long if its servers are vulnerable.

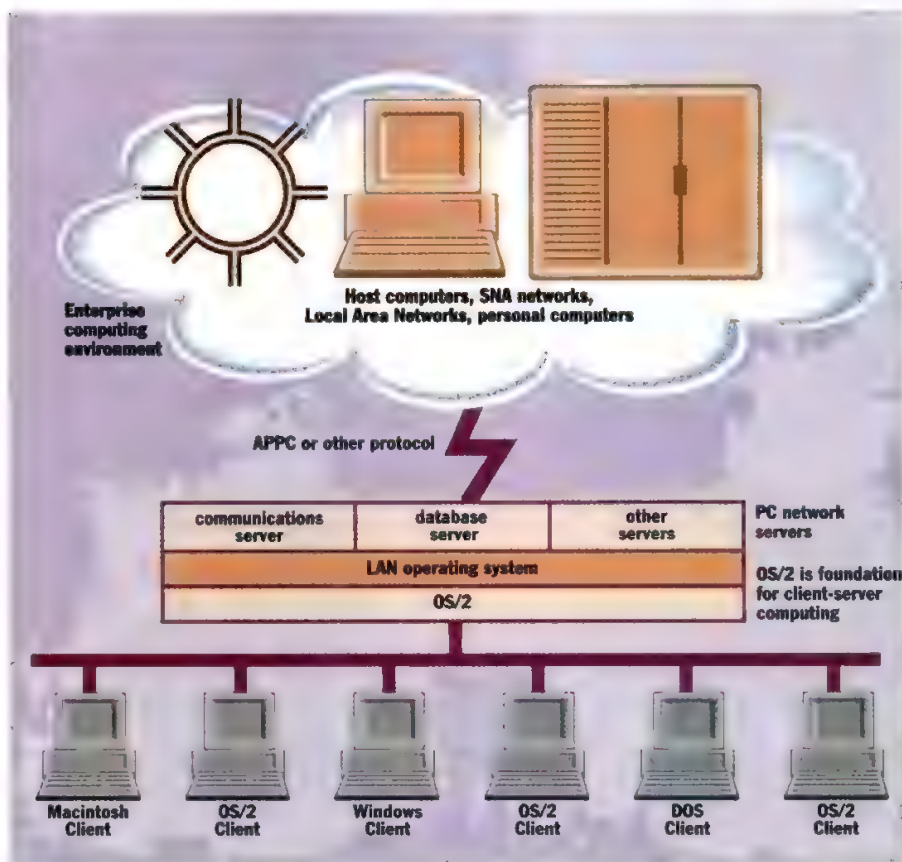
76 OS/2 OFFERS EFFICIENT USE OF NETWORK RESOURCES

OS/2 also provides multiple threads of operation on the network server, so large numbers of workstations on the network can access the server. Because each client PC gets its own thread, the server can keep requests for data equal and in parallel. This translates into efficient use of processor memory.

OS/2 enables software vendors to build products that shield corporate developers from low-level programming chores. For example, Lotus Notes* for OS/2 takes advantage of OS/2's Named Pipes technology to provide remote interprocess communications (IPC) within a client-server application. However, a corporate developer creating an SQL Server application works with a higher-level network communications applications programming interface (API)—within SQL Server—and never needs to work directly with the Named Pipes protocol.

OS/2 PROVIDES FOUNDATION FOR ENTERPRISE COMPUTING

OS/2 was designed to support the exchange of data throughout an enterprise. By choosing OS/2 as the foundation for a network operating system, corporations can support client computers running diverse operating systems while ensuring access to the entire corporate computing structure. Powerful network server products like IBM Database Manager and Lotus Notes make client-server computing a way to speed delivery of information at reduced cost.



77 OS/2 CONNECTS YOU TO DATA ANYWHERE ON THE NETWORK

OS/2 not only brings high performance and bullet-proof protection to the client-server network, the operating system also provides a platform for finding and sharing data from wherever it may reside in the corporation. With IBM Extended Services version 1.0, desktop PCs communicate with any computer that supports Advanced Program-to-Program Communications (APPC). This means that any OS/2 enabled computer talks to any system that supports this universal protocol.

And when IBM's Extended Services are added to a computer running OS/2, that computer may access data from any system on the network running APPC—from PCs, Macintoshes*, UNIX workstations, AS/400s, and many other types of minis and mainframes. This turns a network running wide area network protocols into a framework for "extended" client-server computing. OS/2 Extended Services makes this more than simply a pipeline to a host system and provides access to virtually any computer on the network.

When Advanced Peer-to-Peer Networking (APPN) is added to the communications mix, application installation, configuration, and network management become easier. OS/2 is now the only desktop operating system that supports APPN, giving it the ability to go virtually anywhere.

78 TIP: WHERE TO FIND OUT MORE ABOUT APPC

To access the APPC Info Exchange Forum on CompuServe, type GO APPC at the ! prompt. IBM has created the APPC Market Enablement Group especially to inform software vendors and application developers. This group publishes a newsletter on APPC, APPN and CPl-C, along with a directory on APPC training and products. The group also holds conferences for developers and vendors and provides hands-on training courses. The APPC Market Enablement Group can be reached at (919) 254-4957 or via Internet to appcmrkt@vnet.ibm.com.

79 OS/2 MAKES THE NETWORK ADAPT TO YOU, RATHER THAN THE OTHER WAY AROUND

Finally, we have transparent networking. OS/2 gives you an easy way to customize your networking environment via the Workplace Shell. Because the Workplace Shell is object-oriented, it graphically represents a network operating system, such as IBM LAN Server. So you are treated, for example, to a graphical display of all the available services on the network through OS/2's resident Desktop. A remote device will appear to be local.

OS/2's rich set of networking capabilities provide the user with customized network resources for maximum productivity, and a development platform where rich business applications can be created. Selected servers are grouped into "domains." Then, when you select a server, it displays the associated resources. You can then assign resources a "local identifier" (a local drive designation). After following this simple, object-oriented procedure once, the selected resources appear as local resources.

80 TIP: GOING PLACES IN THE WORKPLACE SHELL

You can use the OS/2 Workplace Shell to include remote objects and resources in your local machine Desktop configuration. With the Workplace Shell Network Object, you navigate to remote objects by pointing and clicking with your mouse. The Network Object is a folder in the Workplace Shell; the objects within the folder are server objects. After selecting a server, use standard Workplace Shell procedures to include remote objects in your Desktop configuration. For example, by holding down the Ctrl key and the right mouse button on a remote object, you drag a "shadow" of that object onto your Desktop. Once a remote object is in your Desktop configuration, you work with it just as easily as with local objects.

OS/2 IS A SUPERIOR DEVELOPMENT PLATFORM

81 OS/2 PROVIDES A POWERFUL PLATFORM FOR SERVER-BASED APPLICATIONS

OS/2 gives applications developers a powerful platform for developing complex applications. With features like protected-mode memory, a full 32-bit flat memory model, and multiple threads, developers can write robust 32-bit business applications. For example, a customer database application developed in Lotus Notes may reside on a server in Chicago. Notes uses the multiple thread capabilities of OS/2 to automatically replicate the customer database to other network servers located in other cities. In effect, the servers are dynamically calling one another to replicate and update the database. Remote users are able to call into the nearest database and have the server copy the customer database onto their PC. And only the changed records are updated.

82 OS/2 PROVIDES A PLATFORM FOR DESKTOP APPLICATION DEVELOPMENT

OS/2 provides application developers with a protected, productive environment for developing DOS, Windows or OS/2 applications. Within a single OS/2 system, a developer can concurrently design, edit, compile, test and debug for three popular operating systems, as well as those for mini and mainframe systems.

OS/2 gives developers the ability to run multiple processes simultaneously. Given the complexity involved in the programming of elaborate applications, this provides a major productivity gain.

For example, a developer may compile a program in the background while testing another program in the foreground. If and when the foreground process fails, the compilation will continue unaffected. As a result, the development process progresses much more quickly and smoothly.

83 OBJECT ORIENTATION STREAMLINES DEVELOPMENT

OS/2 includes a language-neutral, object-oriented programming mechanism called the System Object Model (SOM). SOM is specifically designed to support a new, object-oriented structure, and to be usable with both procedural (non-object-oriented) languages and object-oriented languages. IBM developed the Workplace Shell by using the set of objects and classes included in SOM, and these are available to all OS/2 programmers to speed the development process.

84 OS/2 HAS BECOME A PREFERRED PLATFORM FOR DEVELOPERS

Developers like writing applications under OS/2. Its innate advantages give them room to create software that goes beyond the monotonous, memory-limited programs that have become commonplace in the PC market. Instead of attempting to shoehorn capabilities into a tiny box, OS/2 gives developers a wider playing field to follow their imagination with fewer restrictions.

The OS/2 development process is not only more powerful, it is simpler. Programming commands are executed in a more direct, explicit way. In the long run, the streamlined development process results in more efficient programs, happier programmers and delighted end users.

The object-oriented approach employed by SOM gives developers a significant advantage over older procedural programming techniques. SOM is not a programming language, but a system for defining, manipulating and releasing object-oriented class libraries. SOM consists of a runtime library and a set of utility programs that support building, externalizing and manipulating software objects. SOM is used to define classes and methods, while allowing developers to use the language of their choice for implementing these methods. (The current release of SOM supports the C language.) Most programmers will be able to use SOM quickly, without having to learn a new language syntax.

85 OS/2 TOOLS ARE A COMPLETE 32-BIT DESIGN SET

IBM provides a robust set of tools to speed the development of OS/2 32-bit applications. There are four core development tools: The IBM C Set/2 C compiler, the OS/2 Developer's Toolkit, the WorkFrame/2 development environment, and the OS/2 Technical Library. Qualified developers can also receive the OS/2 Professional Developer's Kit. These tools combine to provide professional developers with a complete solution for designing and implementing sophisticated 32-bit OS/2 applications.

86 WINDOWS APPLICATIONS ARE EASILY TRANSLATED INTO OS/2

With Micrografx Mirrors*, Windows applications can be quickly and readily ported to OS/2. Mirrors gives software vendors more opportunities to market their products, and it gives corporate developers a better way to meet user needs or for large corporations to develop in-house applications that don't require massive retraining.

A ported application, while still 16-bit, has performance advantages. OS/2 manages memory more intelligently than Windows, resulting in better performance. In addition the OS/2

32-bit graphics engine provides much higher performance than the older 16-bit engine. The result is the best of both worlds. Mirrors makes every effort to retain identical operation between the original and ported versions, without sacrificing the OS/2 look and feel.

87

IBM SUPPORTS OS/2 DEVELOPERS

The IBM Worldwide Developer Assistance Program (DAP) supports any developer, anywhere, in the development of OS/2 applications. Commercial software developers can extend their membership in DAP with the Commercial Services program. This program includes additional online technical support, complimentary subscriptions to *OS/2 Developer* magazine, and discounts on IBM products, along with marketing assistance for commercial products. Vendors whose applications exploit the 32-bit capabilities of OS/2 receive all these services, plus a personal advocate within IBM who provides assistance and support and direct E-Mail access to the IBM Boca Raton Programming Center.

IBM provides corporate developers with OS/2 development assistance through the IBM Technical Coordinator Program. This program supports corporate technical coordinators through the IBMLink electronic support library. The program also includes a monthly newsletter, the *Personal Systems Technical Solutions* magazine, satellite television updates, and conferences on technical support.

For more information on the IBM Worldwide Developer Assistance Program, call (407) 982-6408 or FAX (407) 443-4233. In Canada, call (416) 946-3786. For information on the IBM Technical Coordinator Program, call (800) 547-1283. To enroll in the OS/2 Developer Assistance Program, type GO OS2DAP at the CompuServe command prompt.

OS/2 HAS A GREAT FUTURE

88

WHAT'S NEXT FOR OS/2?

Since its release last spring, OS/2 has gained accolades from all walks of the computer industry. Also since that time, IBM has worked to further refine the system. It is bringing the most talented systems designers and developers in the world to Boca Raton to join the development team, to develop future versions.

This year, OS/2 will be pre-installed on a growing number of hardware systems from many PC vendors worldwide. Furthermore, as the operating system evolves, it will become available on several different computer architectures, including RISC and new Intel processors. And popular features of OS/2, like the Workplace Shell, will begin appearing in a wide variety of systems and devices, such as DOS and AIX. IBM is fully committed to exploiting emerging hardware and software technologies that customers want.

89

OS/2 WILL MAKE A GOOD SYSTEM EVEN BETTER

Future versions of OS/2 will include a number of improvements targeted at improving performance and fully exploiting OS/2's 32-bit architecture, the two major requests from the growing installed base of users.

These upgrades will include features like a completely new graphics engine with superior screen display and more flexibility for OS/2 developers. OS/2 will expand support for Windows. It will also include multimedia extensions (previously available separately) to integrate sound, video and text.

90

OS/2 WILL ENHANCE WINDOWS FUNCTION

Support for Windows 3.1 environment under OS/2 will give you much more than just Windows. By running Windows 3.1 applications under OS/2, you will get all of the benefits of the DOS graphical user interface within the framework of a true 32-bit operating system. OS/2's WIN-OS/2 component will run Windows 3.x programs in real and standard mode.

OS/2 will also take best advantage of Windows' under-the-hood features.

These include the ability to link "live" copies of files and data between programs with Object Linking and Embedding (OLE) and Dynamic Data Exchange (DDE). Also, OS/2 will include Windows multimedia extensions, as well as a set of the Windows 3.1 "applets," including the Calculator, Cardfile and File Manager.

91

THE GRAPHICS ENGINE WILL BRING STUNNING VISUAL POWER TO OS/2

The OS/2 graphics engine—which translates OS/2 commands into what you see on the screen—will make it possible to create and display stunning images. A full 32-bit implementation of the graphics programming interface, it nonetheless will be fully compatible with 16-bit device drivers. Your existing display drivers will work as well as they do today.

The graphics engine will support higher graphical resolution than was possible under OS/2 previously, while being compatible with your current hardware. The developer will gain more control and more options with the graphics engine since it enables the use of the Palette Manager, which fine-tunes color schemes. For the user it will offer better looking screens, and maintain color when you click from one window to another. Users will also notice that graphics will generally paint faster with the addition of the 32-bit graphics engine.

92

OS/2 WILL BECOME SMALLER

And what do customers want? Consistently, they have told IBM that a good operating system must take up as little space as possible, both in RAM and on the hard disk. At the same time, power cannot be compromised.

IBM has begun work already to shrink OS/2's system memory requirements. Today, OS/2 can run two substantial applications simultaneously in 6 MBs of RAM. IBM's goal is to match this performance in a 4 MB system, to enable users to run OS/2 on smaller, less powerful machines, or free up memory on larger machines.

In addition to shrinking the amount of RAM required by OS/2, future versions will help to further minimize the

amount of hard disk space required by the system. Today's OS/2 already allows you to select or omit applets at installation, to use only the features that meet your needs. As you buy more powerful programs to replace OS/2's included applets, it will be easy to reclaim hard disk space. IBM is also looking at new compression techniques that will reduce the system's hard drive storage requirements even more. With these new features, there will be additional space on the hard drive for exciting new 32-bit applications.

93 OS/2 WILL BECOME FASTER

In addition to the shrinking of operating system memory requirements, users can expect increased speed and performance in both the operating system and the applications. The result will be faster program loading and faster performance, especially for applications that exploit features such as pre-emptive multitasking, 32-bit flat memory model, and the High Performance File System (HPFS)—all features which hold great benefits for the business user.

As computer hardware pushes the speed envelope, OS/2 will continue to expand device-driver support to take advantage of these new technologies. By replacing 16-bit device instruction sets with the 32-bit graphics engine, OS/2 will fully exploit accelerator cards and other performance-related



WORD PROCESSING DELUXE

DeScribe 4.0, a full 32-bit application, takes full advantage of the Workplace Shell's drag-and-drop functions. Here, a FAX cover sheet object is dragged to DeScribe's insert icon, automatically placing its contents at the cursor point.

hardware technologies. In addition, OS/2 will continue to support new hardware technologies as they emerge in the marketplace. So as new machines emerge, users won't need to relearn basic commands.

95 OS/2 WILL CROSS PLATFORMS

IBM Personal Software Products will continue meeting customers' needs by extending the OS/2 operating system to new computer architectures, including RISC-based systems like the PowerPC, new Intel-based platforms, and other emerging platforms. The company intends to make OS/2 portable and to add support for multiprocessor computers.

When OS/2 is made portable, you will be able to run DOS, Windows and OS/2 applications across Intel and non-

Intel architectures, thereby closing the gap between the applications you want to run and the hardware you own. In addition to developing a portable OS/2, IBM intends to make the Workplace Shell a common user interface across multiple platforms. For example, the Workplace Shell will be available on the AIX/PC operating system, as well as DOS. OS/2 will also be enhanced to support pen-based computers.

96 OS/2 APPLICATIONS ARE FLOODING THE MARKET

By the end of 1992, there were over 1,000 native OS/2 applications available. Many of these take full advantage of OS/2's 32-bit memory model and its robust implementation of pre-emptive multitasking. All of them have the potential to enhance your computing environment.

OS/2 applications span the full range of user requirements, from astonishing 32-bit games to powerful word processors like DeScribe to products that introduce a new model for client-server computing like IBM Database Manager for OS/2. And OS/2 will run your DOS and Windows applications transparently, combining the new generation of powerful 32-bit applications with your current software.

97 OS/2 WILL BRING MULTIMEDIA AND NETWORKING INTO THE FOREFRONT

Soon, OS/2 will make it even easier for people to tap into the power of multimedia and networking. Upcoming versions of OS/2 will incorporate multimedia extensions into the base operating system, with no rewiring required. This means that users will be able to interact with the computer in a more natural way, using speech and audio to direct the activities of the OS/2 Workplace Shell. Users will also be able to play movies on-screen from either remote or local video files at rates in excess of 15 frames per second, fast enough to eliminate the jerkiness associated with motion video on computers today.

IBM also intends to make OS/2 "LAN ready," so that when it's installed as a network client, the client

94

OS/2 WILL BECOME MORE PLEASURABLE TO USE

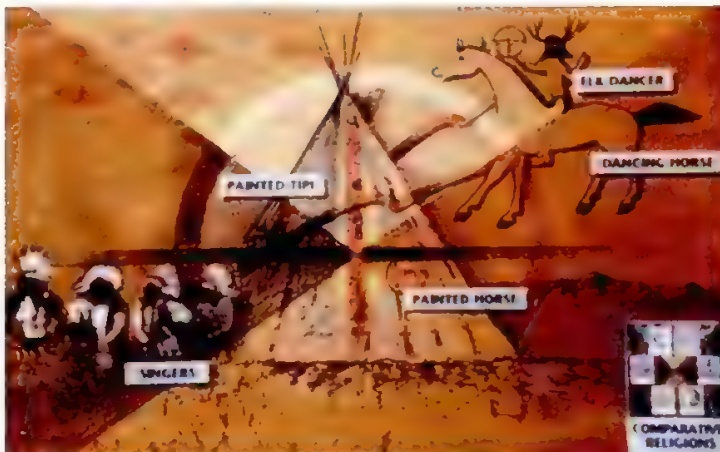
A smaller and faster operating system will be more enjoyable to use in the broadest range of environments, and will be the ideal foundation for new "applets." For exam-

ple, a FAX application with a Presentation Manager interface and drag-and-drop capability is planned. IBM is also exploring more intuitive input methods, like speech, pen and touch.

IBM will also be extending OS/2's object orientation to make the system even easier to master. The drag-and-drop capability in the Workplace Shell, for instance, could evolve so that you might drag the title bar of a folder onto a printer icon and automatically print every file in that folder. This saves time and lessens the number of commands to execute a function.

MAJOR DISCOVERY

OS/2 Multimedia can help you to rediscover history. Here, with IBM's "Columbus" application, OS/2 displays images, sound and text in ways that other systems do not permit; to take you back in time.



computer will automatically recognize the network. To do this, IBM expects to use some functions available in OS/2 Extended Services today, along with new capabilities in development. A "LAN ready" version of OS/2 would recognize Novell NetWare* and other network operating systems, as well as IBM LAN Server networks. Installation and configuration of local area networks will be much easier for users and administrators.

98 OS/2 IS THE BEST PLATFORM TO EXPLOIT MULTIMEDIA

Multimedia computing has received a great deal of attention in the last year, as vendors introduce new and sometimes conflicting standards. OS/2 is unique among multimedia products in its ability to support robust multimedia applications without any loss in content quality or performance.

Because OS/2 can run multiple processes simultaneously, OS/2 multimedia applications can simultaneously pull video threads and audio threads, from remote (networked) sources or the local hard drive, without causing any of the jerkiness or freezing associated with other operating system platforms. With the right hardware, users can even view several video clips simultaneously, scale the size of windows containing video, and modify playback speed without degrading system performance.

OS/2 now has digital sound capability which was previously available as a separate product. Full motion video support will be available later this year, completing the OS/2 multimedia equation.

99 IBM WANTS YOU TO STAY IN TOUCH

IBM wants OS/2 to fulfill your expectations of a superior operating system, and it can only do that if you give the company your input about OS/2. What do you like about the system? How could it be improved? Is there something missing that you need for your specific task? Is there something about OS/2 that could be

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If this supplement has whetted your appetite for information about OS/2, it's easy to find out more.

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If you can't get to a computer store, additional information about OS/2 is available from the IBM Order Center. This group takes your order for a copy of OS/2. To reach the IBM Order Center, call (800) 3IBM-OS2 (342-6672).

For IBM technical manuals on OS/2 and other IBM products, call PC Books, the distributor of IBM publications, at (800) 426-7282.

To access the OS/2 forums on CompuServe, type GO IBMOS2. Subscriptions to OS/2 Developer magazine

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If you still can't get the information you need or have a question that doesn't fall into any of these categories, contact the IBM General Information Center: (800) 426-3333. In Canada, call (800) 465-7999.

Special thanks to One-Up Corporation, (800) 678-0187, for compiling screen shots for this supplement.

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Getting Today's Date Shortening Your Path

BY NEIL J. RUBENKING

GETTING TODAY'S DATE

In the October 29, 1991, User-to-User column, you published some batch files for generating unique, sequentially numbered filenames. I've taken a different approach to file naming, based on the date the file was created. I use this approach for making daily backups of critical files. In my case, these are Quicken files, but they could be anything.

I wanted to make a backup to my second hard drive every day I run Quicken, using a different name each time. Changing the names of the backup files lets me use a single directory, drive, or floppy disk for multiple backups without overwriting previous backups, ensuring that any introduction of bad data will not contaminate my only backup data set.

Quicken's default set of four data files are named GENERAL.*. I wanted to come up with a command such as:

```
copy general.*
D:\qbaks\[unique_name].*
```

where *unique_name* would be the date of the backup—for example, 920817. Having the date in YYMMDD format would make it easy to sort or select the files.

Unfortunately, batch files can't import the system date directly. You need to put the date into the environment, so I wrote a BASIC program that generates a batch file that creates an environment variable with the current date.

The Date command in BASIC returns a date in the form MM-DD-YYYY, but what I wanted was YYMMDD. TODAY.BAS (Figure 1) manipulates the output of the Date command to produce a batch file that in turn sets an environment variable in the desired format. I used the QBASIC that comes with DOS 5.0. Other BASIC versions may need line numbers.

TODAY.BAS

Complete Listing

```
D$ = MID$(DATE$, 4, 2)
M$ = LEFT$(DATE$, 2)
Y$ = RIGHT$(DATE$, 2)
today$ = Y$ + M$ + D$
OPEN "today.bat" FOR OUTPUT AS #1
PRINT #1, "set today="; today$
CLOSE #1
SYSTEM
```

Figure 1: This BASIC program generates the batch file TODAY.BAT, which sets the environment variable today to the current date in YYMMDD format.

My AUTOEXEC.BAT file runs the BASIC program to create the batch file TODAY.BAT, then runs TODAY to set the environment variable, like so:

```
qbasic /run\bat\today.bas
call today
```

The CALL command was introduced in DOS 3.3; if you use an earlier DOS version you'll have to run TODAY.BAT from the command line.

This is the batch file I use to run Quicken:

```
cd C:\Q4
q.exe
copy general.* d:\q4baks\%today%.*
cd \
exit
```

As you can see, it uses the today environment variable to back up the important files.

Randy Brook
Seattle, Washington

► **PC MAGAZINE:** TODAY.BAS certainly succeeds in establishing an environment variable containing the current date in YYMMDD format. Still, I couldn't help wondering if I could accomplish the same task *without* using BASIC. I indeed suc-

ceeded, due to an odd, undocumented feature of the FOR command.

Normally FOR serves to apply a particular action to every item in a list, or to all files matching a wildcard file specification. But if an item on the FOR list is preceded by a forward slash, FOR treats that item as two separate strings, the first character and the rest. Try it—enter

```
FOR %v IN (/brain) DO ECHO %v
```

at the DOS command line. This command will echo "b" and "rain" to the screen.

GETODAY.BAT, shown in Figure 2, first needs to get the current date. It pipes the output of ECHO. (ECHO followed immediately by a period) into the DATE command, simulating a press of the Enter key. The output of the DATE command is redirected into DATETMP\$.BAT, which will look something like this:

```
Current date is Tue 07-28-1992
Enter newdate (mm-dd-yy):
```

When DOS executes this batch file, it will attempt to run a program or batch file named CURRENT. GETODAY.BAT creates CURRENT.BAT by redirecting the output of the ECHO command. The result is a file containing only the command SET Today=%4. The CALL command executes DATETMP\$.BAT, which in turn executes CURRENT.BAT. The result? CURRENT.BAT sets the

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GETODAY.BAT

Complete Listing

```
@ECHO OFF
REM GETODAY.BAT - gets today's date into the e-var Today
REM   in the format YYMMDD.
ECHO. | DATE > DATETMP$.BAT
ECHO SET Today=%*4>CURRENT.BAT
CALL DATETMP$
DEL DATETMP$.BAT
DEL CURRENT.BAT
SET count=

REM Loop1 changes Today to -YYYYMMDD
:Loop1
SET old=%Today%
FOR %%v IN (/%%Today%) DO SET Today=%%v
FOR %%v IN (/old%) DO IF '%%v'=='-' GOTO skip
FOR %%v IN (/old%) DO IF '%%v%%Today%'=='old%' SET Today=%%Today%%v
:skip
REM ECHO The value of Today is "%Today%"
SET count=%count%x
IF NOT '%count%'=='xxxxx' GOTO Loop1

REM Loop2 reduces Today to YYMMDD
:Loop2
FOR %%v IN (/%%Today%) DO SET Today=%%v
REM ECHO The value of Today is "%Today%"
SET count=%count%x
IF NOT '%count%'=='xxxxxxxx' GOTO Loop2

FOR %%v IN (old count) DO SET %%v=
```



Figure 2: This batch file gets the date from the DATE command and manipulates it into YYMMDD format.

environment variable Today to the current date. This date is in the MM-DD-YYYY format; the rest of the batch file is devoted to converting it to YYMMDD.

The batch lines at the label Loop1 repeatedly take the first character of the e-var Today and put it at the end of that string. If the character is a dash, it is discarded. This process is totally dependent on the FOR command's special handling of the forward slash character.

The first line after the label Loop1 sets the e-var Old to the current value of the e-var Today. Next comes a FOR command that prefixes a forward slash to the value of Today. The action portion, SET Today=%%v, is executed twice, once for the first character in the string and once for the remainder of the string. The second SET command supersedes the first, so this line effectively chops the first character from the e-var Today. Another FOR command prefixes a forward slash to the value of the e-var Old, and jumps to the label Skip if the first character of Old is a dash.

If the first character is not a dash, the third and most complex FOR command gets executed. It too prefixes a slash to the value of the e-var Old, so the FOR variable %%v is replaced by the first character of that string and then by the

rest of it. The IF command in the action portion grafts the FOR variable onto the front of the e-var Today and compares the result with the value of the e-var Old; the two will be equal when the FOR variable is the first character of Old. If so, the SET command appends that character to the end of the e-var Today, effectively moving it from the beginning to the end of the string.

Having performed this feat, the batch file appends an x to the initially empty e-var count. If count has not yet grown to five x's, a GOTO command jumps back to the beginning of the loop. After five times through this loop, the MM-DD-YYYY date has been converted to the form YYYYMMDD.

All that's necessary now is to trim the unwanted dash from the beginning of the date, along with the two unwanted digits of the year. Another loop, starting at label Loop2, handles this task. This loop just contains a FOR command that strips the first character from the e-var Today. After three passes through the loop, Today has been converted to the desired format, YYMMDD.

It is difficult to follow this batch file, because the behavior of the FOR command is so peculiar. If you want to get a better picture of the process, find the

two lines that begin REM ECHO and delete the word REM. Now when you run GETODAY.BAT, you'll see the value of the e-var Today as it gradually changes to the desired format.

The FOR technique used in GETODAY.BAT can be applied in many different ways to manipulate strings within batch files. I've used it to reverse a string, to check for the presence of characters within a string, and to determine whether a user-specified directory name is a root directory. I'm sure you'll find a variety of uses for it as well. (Download TODAY.BAS and GETODAY.BAT from PC MagNet archived as TODAY.ZIP.)

SHORTENING YOUR PATH

I found a very simple solution to a common problem: the limited length of the PATH variable. Just about every program we install on our computers wants its own directory on the PATH. Soon you end up with a PATH that's longer than DOS permits. Nearly every user wants the PATH to lead to their most frequently used software. To be sure a favorite utility will be available everywhere, we always put its directory on the PATH.

One common suggestion is to use the SUBST command and replace long pathnames with drive letters. So, instead of

```
Path C:\WINDOWS\WORK\EXCEL;...
```

you can use

```
SUBST E: C:\WINDOWS\WORK\EXCEL
PATH E:;...
```

I think I have a better idea, though. Instead of adding a directory to the PATH for a single program, use the DOSKEY utility included with DOS 5.0 to create a macro for that program:

```
DOSKEY NC=C:\SYSTEM\UTIL\NC
```

This works just as well for starting a program (in this case one called NC) from any directory, but it has additional advantages. First, it lets you shorten the PATH, and second, it's much faster. Some programs may need to be on the PATH to find their files, but for most programs a DOSKEY macro works just fine.

Piotr Plociennik
Kalisz, Poland

► **PC MAGAZINE:** Another common suggestion to avoid inflating the PATH involves creating a batch file to run each program. But each batch file you create takes at least one cluster (2K or more) of space on your disk! DOSKEY macros, on the other hand, take no disk space beyond the batch file line that loads them, and one batch file occupying a single 2K cluster can probably load all the DOSKEY macros you'll need. Of course you'll still include your DOS and batch file directories on the PATH, and probably a directory for general utilities. The purpose of this tip is to avoid adding a directory to the PATH for the benefit of a single program.

Many programs require one or more command line parameters. To accommodate such programs, your DOSKEY macros will have to pass along those parameters. The special symbol \$* in a DOSKEY macro represents everything on the command line. Just add the following symbol after the command name in your macro, for example:

```
DOSKEY WP=C:\PROG\WP51\WP $*
```

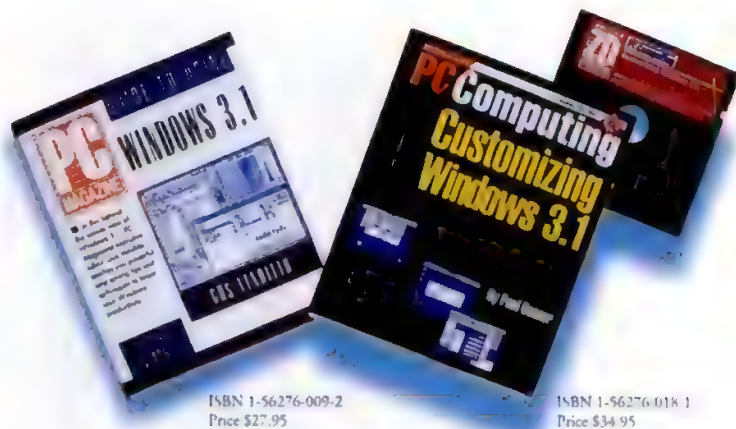
Some older programs have trouble finding their files when they're not on the PATH, but even these programs may be served by DOSKEY macros. Usually such a program will run fine if you execute it from the directory in which it resides. If a program seems not to work when it's not on the PATH, try a DOSKEY macro such as this one:

```
DOSKEY WP=C: $T CD C:\PROG\WP51 $T
WP $*
```

This macro first switches to the drive and directory containing the program and then executes the program itself. The special symbol \$T separates commands, and the \$* symbol represents the command line, as before. It's a good idea to get in the habit of creating DOSKEY macros instead of adding single-program directories to your PATH—you'll be amazed at how short the PATH can be! □

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A Look Inside Windows Icons, Part 2

BY JEFF PROSISE

The previous column—part one of two covering Windows icons—examined the format of .ICO (icon resource) files to show what they store. Recall that an .ICO contains an icon directory and one or more icon images.

This second installment looks at what Windows does with icons and how it decides which it will use to represent a minimized application. As you'll see in a moment, there's a lot more to it than meets the eye.

WINDOWS RESOURCES To a Windows application, an icon is just another *resource*—the term Windows uses for special data objects that are encapsulated in a program's .EXE file. There are many kinds of resources: the pull-down menus at the top of a window, cursors (the mouse pointers that Windows draws on the screen), bitmaps, dialog boxes, keyboard accelerators, and in certain cases, character strings. Programmers can even create custom resources if they wish.

Storing data as a resource is advantageous because Windows has API (application program interface) functions that let programs access the resources embedded in their .EXE files by name. In a program under development, resources such as icons and menus are usually defined in a special file called a resource script—an ASCII text file with the extension .RC. This is compiled into binary form, then linked into the program's .EXE file using a utility known as a resource compiler (supplied with Windows developers' toolkits such as Microsoft's Windows SDK or Borland's C++ compiler).

The following resource script statements create icon resources from the files ICON1.ICO, ICON2.ICO, and

ICON3.ICO, assigning them the names FirstIcon, SecondIcon, and ThirdIcon, respectively.

```
FirstIcon    ICONicon1.ico
SecondIcon   ICONicon2.ico
ThirdIcon    ICONicon3.ico
```

The first word on each line is the name of the resource, the second (ICON, here) specifies what type of resource it is, and the third identifies the file containing it—in our example, an .ICO file that holds the icon image.

If the program containing these resources in its .EXE file wants to display one of the icons, it only needs to make two function calls to Windows. The first obtains a *handle* to the icon resource, and the second draws the icon on the screen. (A handle is a 16-bit number assigned by Windows and used, in this case, to identify the icon resource.) In C, it looks like this:

```
hIcon = LoadIcon (hInstance,
    "FirstIcon");
DrawIcon (hdc, xPos, yPos, hIcon);
```

In the second statement, xPos and yPos mark the x,y screen coordinates of the icon's upper-left corner; and hdc is a handle to a *device context*, which Windows requires before allowing you to perform any action on the screen. (A device context specifies the graphic output device to be used and simplifies the process of writing to it.) As you might guess, hIcon is the icon's handle. Storing icons as resources shifts the bulk of the work involved in their storage and display to Windows.

REGISTERING A CLASS ICON From the example above, it's logical to guess that when a Windows application is minimized it draws its own icon on the screen

by calling DrawIcon. It could do this, but there's an easier way. When you minimize a Windows application, Windows takes care of shrinking it to an icon; the program doesn't have to do a thing. Actually it doesn't even know it has been minimized unless it traps the messages Windows sends telling it that it's about to be iconized, or unless it uses Windows' IsIconic function to determine whether or not it already is iconized. So Windows displays the icon, but how does it know which to use?

The answer is deceptively simple. Every window is based on a *window class*—a template that defines the default properties of a window such as its style or the color that will be used to paint its background. Windows includes several predefined window classes such as buttons and list boxes. When started, though, most Windows programs register their own window classes using the RegisterClass function as shown below:

```
wndclass.style = 0;
wndclass.lpfnWndProc =
    (WNDPROC) WndProc;
wndclass.cbClsExtra = 0;
wndclass.cbWndExtra = 0;
wndclass.hInstance = hInstance;
wndclass.hIcon = LoadIcon
    (hInstance, szClassIcon);
wndclass.hCursor =
    LoadCursor (NULL, IDC_ARROW);
wndclass.hbrBackground =
    (HBRUSH) COLOR_WINDOW + 1;
wndclass.lpszMenuName =
    szMenuName;
wndclass.lpszClassName =
    szClassName;

RegisterClass (&wndclass);
```

(After this is finished, the program calls another API function, CreateWindow, in order to create a window

based on the registered class.)

Examine the values loaded into the window class structure above, and you'll see how Windows associates an icon with a window. One of the fields holds the handle of the default icon, as shown by the sixth line in our example:

```
wndclass.hIcon = LoadIcon
(hInstance, szClassIcon);
```

When you minimize a program, Windows retrieves this icon handle from the window class structure (which is stored in memory) and then calls DrawIcon to display the icon.

A program can obtain a handle to its class icon by placing a call to GetClassWord:

```
hIcon = GetClassWord (hwnd,
GCW_HICON);
```

Similarly, a program can change the default class icon using SetClassWord:

```
SetClassWord (hwnd, GCW_HICON, hIcon);
```

If there are two instances of a program

active, and one of them is minimized and the other calls SetClassWord to change the class icon, the minimized program's icon remains will not change immediately. It will, however, change the next time that instance of the program is minimized.

Icons for non-Windows applications are handled in a slightly different manner. When you launch this type of program, Windows 3.1 creates a window for the application under the class name "tty" and assigns an icon handle of zero, meaning the application itself is responsible for drawing its icon. When a non-Windows application is minimized, Windows sends a WM_PAINT message to the program's window procedure, which responds by displaying the icon on the screen.

The window procedure draws the icon assigned to the application in Program Manager if the application was started from Program Manager. If it wasn't started from Program Manager, a generic MS-DOS icon is displayed. This differs from Windows 3.0, which shows a generic icon for all non-Windows applications, regardless of how they were started.

How does the window procedure know what icon you assigned to a non-Windows application in Program Manager? When you launch a DOS program, the window procedure initiates a DDE (Dynamic Data Exchange) conversation with Program Manager. In addition to asking it for information about the icon, the window procedure also asks for the window title and the working directory. If you have the Windows 3.1 SDK, you can use the DDESpy utility included to eavesdrop on the exchange.

CHOOSING THE RIGHT ICON When discussing icon resource files in the previous issue, I mentioned that they can contain several icons, raising the question of how Windows chooses the one to use. I also noted briefly that Windows picks the icon with the size and number of colors that best matches the capabilities of your video hardware. Let's take a closer look.

On 640-by-200 CGA screens, Windows uses icons 32 pixels wide and 16 high that contain 2 colors, but on color EGA (640-by-350), VGA (640-by-480), Super VGA (800-by-600), and 8514/A (1,024-by-768) screens it uses 16-color icons of 32 pixels on a side. If an .ICO

SYSDOS.C

Complete Listing

```
#include <windows.h>

long FAR PASCAL WndProc (HWND, WORD, WORD, LONG);

/*****
WinMain starts the program.
*****/

int PASCAL WinMain (HANDLE hInstance, HANDLE hPrevInstance,
LPSTR lpszCmdLine, int nCmdShow)
{
    static char szClassName[] = "SysIcons";
    WNDCLASS wndclass;
    HWND hwnd;
    MSG msg;

    if (!hPrevInstance) {
        wndclass.style = 0;
        wndclass.lpfnWndProc = (WNDPROC) WndProc;
        wndclass.cbClsExtra = 0;
        wndclass.cbWndExtra = 0;
        wndclass.hInstance = hInstance;
        wndclass.hIcon = LoadIcon (NULL, IDI_ASTERISK);
        wndclass.hCursor = LoadCursor (NULL, IDC_ARROW);
        wndclass.hbrBackground = (HBRUSH) COLOR_APPWORKSPACE + 1;
        wndclass.lpszMenuName = (LPCSTR) NULL;
        wndclass.lpszClassName = szClassName;

        RegisterClass (&wndclass);
    }

    hwnd = CreateWindow (szClassName,
        "System Icons", WS_OVERLAPPEDWINDOW,
        CW_USEDEFAULT, CW_USEDEFAULT,
        CW_USEDEFAULT, CW_USEDEFAULT,
        NULL, NULL, hInstance, NULL);

    ShowWindow (hwnd, nCmdShow);
    UpdateWindow (hwnd);

    while (GetMessage (&msg, NULL, 0, 0))
        DispatchMessage (&msg);
}
```

```
        return msg.wParam;
    }

/*****
WndProc processes messages to the main window.
*****/

long FAR PASCAL WndProc (HWND hwnd, WORD message,
WORD wParam, LONG lParam)
{
    static HICON hIcon[5];
    PAINTSTRUCT ps;
    HDC hdc;
    int i;

    switch (message) {
        case WM_CREATE:
            // Obtain handles to the five system icons
            hIcon[0] = LoadIcon (NULL, IDI_APPLICATION);
            hIcon[1] = LoadIcon (NULL, IDI_EXCLAMATION);
            hIcon[2] = LoadIcon (NULL, IDI_ASTERISK);
            hIcon[3] = LoadIcon (NULL, IDI_HAND);
            hIcon[4] = LoadIcon (NULL, IDI_QUESTION);
            return 0;

        case WM_PAINT:
            // Draw the icons
            hdc = BeginPaint (hwnd, &ps);
            for (i=0; i<5; i++)
                DrawIcon (hdc, (i*72)+32, 32, hIcon[i]);
            EndPaint (hwnd, &ps);
            return 0;

        case WM_DESTROY:
            PostQuitMessage (0);
            return 0;
    }

    return DefWindowProc (hwnd, message, wParam, lParam);
}
```

Figure 1: This short program displays the five system icons that are built into Windows.

file contains multiple representations of an icon, Windows examines the current display mode to determine which image it will show. If no icon matches perfectly—for example, when the .ICO holds only a 16-color, 32-by-32 image and the display uses a CGA—Windows will improvise. In this case, it would omit every other row in the icon's bitmap (compressing the image to a height of only 16 pixels) and convert the 16 colors to monochrome, since a CGA in 640-by-200 graphics mode makes only 2 colors available. The results are rarely pleasing to the eye, but at least Windows doesn't refuse to display the icon altogether.

BUILT-IN ICONS You don't need to create custom icons to use icons in Windows programs. Windows contains five built-in system icons that any program can access. The statement

```
hIcon = LoadIcon (NULL,
    IDI_QUESTION);
```

loads hIcon with a handle to the system icon that depicts a question mark. The remaining identifiers are IDI_APPLICATION, IDI_ASTERISK, IDI_EXCLAMATION, and IDI_HAND.

SYSICONS, the short program listed in Figure 1, loads and displays all five icons. Under Microsoft C 7.0, compile it with the instruction

```
cl -c -Gsw -Ow -W2 -Zp SYSICONS.c
```

and link it using

```
link SYSICONS, /align:16, NUL,
    /nod slibcsw libw, SYSICONS
```

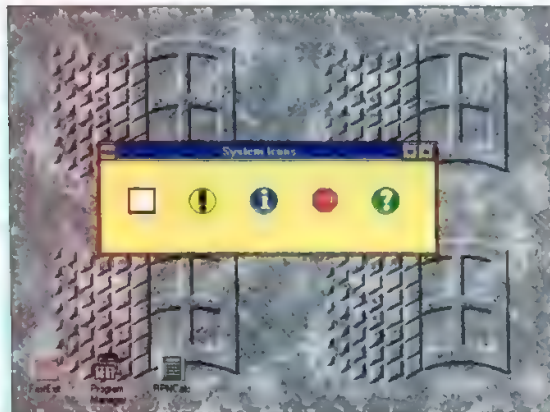


Figure 2: The five system icons built into Windows 3.1. From left to right, they are ID1_APPLICATION, ID1_EXCLAMATION, ID1_ASTERISK, ID1_HAND, and ID1_QUESTION.

Figure 2 shows the output.

You can also download the C source code and executable from the Utilities/Tips Forum on PC MagNet archived as SYSICO.ZIP. Just follow the directions in the sidebar "Utilities by Modem" that accompanies this issue's Utilities column. Those without modems can send a postcard requesting SYSICONS to Katherine West, *PC Magazine*, One Park Ave., New York, NY 10016.

SYSICONS illustrates the ease with which a Windows application can load and display an icon resource. When it receives a WM_CREATE message—which Windows sends to every program starting up—SYSICONS calls LoadIcon once for each of the five system icons. LoadIcon returns an icon handle that SYSICONS stores in the array named hIcon. In response to WM_PAINT messages, SYSICONS then displays the icons with a call to DrawIcon, which accepts four parameters: a handle to the device context, the x- and y-coordinates of the point where the icon's upper-left corner will be drawn, and the icon handle.

SYSICONS, when minimized, displays a white "i" in a blue circle as its icon. This results from the hIcon field of the wndclass structure having contained a handle to the ID1_ASTERISK icon when the window class was registered. (The "i" stands for "information." In early versions of Windows, though, ID1_ASTERISK really did look like an asterisk.)

Strangely enough, if you set the class icon equal to ID1_APPLICATION, Windows 3.1 displays something else entirely—a small Windows logo.

Maybe the folks at Microsoft decided that a Windows desktop that had plain-vanilla ID1_APPLICATION icons lining the bottom would be too boring.

That about does it for Windows icons. If you have a favorite topic you'd like to see covered in a future Tutor column, write me a letter or drop me a note on PC MagNet (CompuServe ID: 72241,44) and tell me about it. You can also contact me via MCI Mail under the user name "jprosis." I welcome your suggestions! □

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RCLICK: A Pop-Up Menu Program for Windows

BY DOUGLAS BOLING

Are you tired of walking your mouse? That's what GUI (graphical user interface) veterans call it when you have to pick up and carry your mouse back to its starting point because you didn't have enough desktop space to move the cursor far enough in one motion.

I've put on most of my mouse mileage moving the cursor to and from a menu in order to select an item there. All those trips to the menu bar made me wish that the menu choices could be brought to the cursor rather than vice versa. That's what RCLICK does. With RCLICK active, any time you press the right mouse button, a duplicate menu will pop up right at the spot where your Windows cursor is currently located.

RCLICK can be configured not to pop up over the few Windows programs that use the right mouse button. The utility will remember the names of these programs, so that you have to teach RCLICK only once.

If you're tired of walking your mouse across the desktop, you can download RCLICK from the Utilities/Tips Forum on PC MagNet. Modem instructions are contained in the "Utilities by Modem" sidebar. If you just want the files to run RCLICK, look for the self-extracting archive RCLIC.EXE. RCLICK.ZIP, however, contains not only RCLICK.EXE and its necessary companion, RCHOOK.DLL, but also all the source files necessary for compiling these programs. To work from the source files, you'll need either the Microsoft C 6.0 compiler and the Windows SDK, or Borland's C++ 3.0 compiler.

If you don't have a modem, you can also get the files directly from *PC Magazine*. Send a postcard with your name, address, and disk preference (360K, 720K,

1.2M, or 1.44M) to the attention of Katherine West, *PC Magazine*, One Park Ave., New York, NY 10016. Alternatively, you can fax your request to 212-503-5799. No phone calls, please!

USING RCLICK To install RCLICK, just copy the RCLICK.EXE and RCHOOK.DLL files into a directory on your path. Then select the File | Run menu item in the Program Manager and enter RCLICK. If you want RCLICK to start each time you bring up Windows, simply add the RCLICK icon to the Program Manager's Startup group, using the File | New menu selection. (If you're still

*With a utility that
brings the menu choices
to the cursor, you'll
no longer have to
maneuver your mouse
through a crowded desktop.*

using Windows 3.0, you'll have to add the RCLICK program name to the RUN= statement in your WIN.INI file.)

The only change you'll see on your desktop when RCLICK starts is the addition of the small RCLICK icon at the bottom of the desktop. The real action begins when you press the right mouse button over a window that has a menu. A pop-up menu will appear that contains all the items on the menu bar plus one additional item that calls up additional RCLICK options. When you click on a menu item, a submenu containing all the menu items for the main menu item will appear. Selecting any one of these items will perform the same action as if you had moved the cursor up to the menu bar and

selected the item there.

For example, if you press the right button over the Program Manager, you'll see a menu containing the items File, Options, Window, Help, and an item labeled RClick. Clicking with the normal left button on the File item will reveal a submenu containing the items New, Open, Move, Copy, Delete, Properties, Run, and Exit. Clicking on the New item will cause the Program Manager to display the New Program dialog box. That's just what would have happened had you selected the File | New menu item from the menu bar. The difference is that you didn't have to move the cursor up to the menu bar and back! Note that if you pop up the RCLICK menu by accident, clicking with the mouse anywhere on the desktop outside the menu will make it go away.

RCLICK builds the appropriate pop-up menu each time you right-click. Clicking on the RClick menu item produces a submenu with two items, Configure and About. Selecting Configure displays a dialog box with three buttons that allow you to configure RCLICK. The first button, labeled "Do not pop up on Window," allows you to tell RCLICK never to pop up over any window from that program again.

The second button, Disable RCLICK, allows you to disable the utility for all windows. The Cancel button closes the Configure dialog box without any action taking place. If you accidentally disable RCLICK you can reenable it using the RCLICK main dialog box, which will be discussed below.

Selecting the RClick About menu item displays the About dialog box, which contains the name and version of the program, along with the copyright notice.

Clicking on the RCLICK icon and then on Restore reveals RCLICK's main dialog box, which is shown in Figure 1.

The list box contains the names of all the programs RCLICK has been told to avoid. Again, the Disable button disables RCLICK for all windows, but in this case when you disable RCLICK, the text of this button changes to Enable. Pressing it will reenable the utility. The Remove button allows you to remove program names from the No Pop list simply by selecting the program name and clicking on the Remove button. The About button displays the same About dialog box that is available from the RClick pop-up menu. The final button, Exit, closes the RCLICK window and ends the program. When the RCLICK program terminates, it saves both the No Pop list and the disable/enable state in its configuration file, RCLICK.INI.

A PEEK INSIDE RCLICK The RCLICK functions are divided between two files. RCLICK.EXE contains the code that displays the main window and that

saves and restores the list of programs to ignore. RCHOOK.DLL contains the code that monitors the system message queue to check for the right mouse button-click and that produces the menu. I'll begin with the systemwide messages and then proceed to a more detailed look at both RCHOOK and RCLICK.

Windows reports various events to applications via messages. Different messages correspond to different events, such as mouse moves, child window notifications, or characters being sent from the keyboard. Messages can be delivered to a window in one of two ways. When a message is *posted* it goes through the system message queue. The target window reads such a message from the queue using

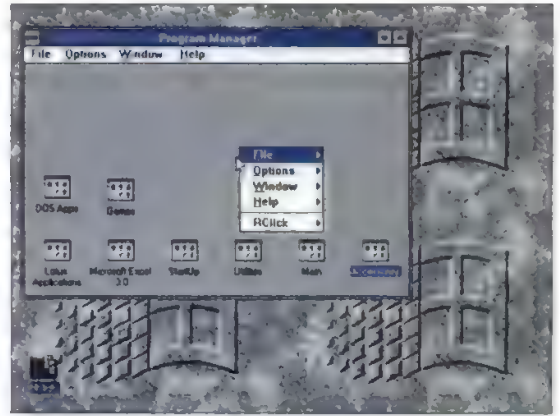


Figure 1: RCLICK's main dialog box lets you disable and enable the utility and shows you which programs you've excluded it from.

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Windows' GetMessage function. The other way a message can be delivered is to be *sent* to a window. Messages that are sent aren't placed in the system message queue; instead, Windows calls the target window procedure directly.

RCHOOK's function is to monitor the system for presses of the right mouse button and to respond accordingly. Since mouse events are reported using messages, RCHOOK can keep track of the mouse if it can monitor all messages that concern the mouse. Normally, messages corresponding to mouse movements and button presses are posted to the window over which the action occurs. Thus, an application usually sees only the mouse events that happen over its own windows. RCHOOK, on the other hand, must monitor the mouse continually, so it must find a way to view *all* mouse-related messages.

There are two ways an application can monitor the movements and actions of the mouse. The first way is to "capture" the mouse by using the SetCapture Windows API function. When an application captures the mouse, all mouse messages are sent to that application, regardless of the mouse position. This function is often used when an application is performing a drag-drop action, since the application doing the dropping must determine which window has been dropped upon when the drag button is released. The problem with this is that only one application at a time can capture the mouse. Consequently, RCHOOK cannot use this method, since it would fail as soon as another program called the SetCapture function for itself.

The other method of tracking the mouse is to hook into the system message queue. Windows provides a function called SetWindowsHook that allows applications to hook into the queue. When an application hooks into the message queue, Windows will call a specified procedure in the application whenever a message is about to be read from the message queue. Hooking into the system message queue lets RCHOOK monitor every message posted to any application on the desktop.

The biggest disadvantage to hooking into the message queue is that it degrades the system performance, since the messages must be processed by every application that has hooked into the queue. This degradation can be quite serious, so any hook function (that is, the function that is called when the message is about to be read) must be written in such a way as to be small and efficient.

Another issue involving hooking into the message queue is more of a design consideration than a problem. Windows requires that hook functions be written in DLLs instead of standard Windows .EXE files. These DLLs must be configured as fixed, nondiscardable code segments so that the hook procedure is always available in memory. This is why RCLICK is divided into the two files, RCLICK and RCHOOK.

Having discussed hooking the message queue in general concepts, it's time to see how RCHOOK implements them. Like all DLLs, RCHOOK contains two standard procedures, LibMain and WEP. The LibMain procedure is called once,

The biggest disadvantage to hooking into the message queue is that it degrades the system performance, since the messages must be processed by every application in the queue.

when the DLL is loaded. The LibMain procedure in RCHOOK simply initializes several global variables and calls the procedure that hooks into the message queue. The WEP function is called when the DLL is about to be unloaded from memory. WEP checks to see whether the hook is still in place and, if so, it calls a routine to unhook the DLL from the message queue.

The SetHook procedure that RCHOOK uses to hook and unhook the

DLL from the message queue is actually quite simple. As shown in Figure 2, SetHook has one Boolean parameter, which indicates whether it should hook or unhook the DLL. To hook into the queue, SetHook calls the Windows API SetWindowsHook function. The call includes the type of hook to set and a pointer to the hook procedure in RCHOOK called MsgHookProc. Actually, SetWindowsHook is called twice, since RCHOOK must also monitor messages sent to windows with the hook procedure, CallHookProc. The reason for this second hook will be discussed a little later in this article.

Each of the many types of hooks that can be set monitors a different aspect of the system. RCHOOK uses the WH_GETMESSAGE as well as the WH_CALLWNDPROC type. A WH_GETMESSAGE hook means that Windows will call a hook procedure each time an application calls GetMessage to read a message from the message queue. A WM_CALLWNDPROC hook causes Windows to call the hook procedure whenever a window procedure is called as the result of a message being sent to a window.

Hook procedures are similar to window procedures in that they must be declared as external procedures and listed in the .DEF file. Hook procedures are called with three parameters: code, wParam and lParam. The code parameter indicates whether the hook procedure should process the message or pass it on immediately to the next hook procedure. The meaning of the wParam and lParam parameters varies somewhat among the different types of hooks. In general, however, the lParam parameter points to a structure that contains information about the message or event being processed, while wParam either provides status information or is undefined.

For the WM_GETMESSAGE hook, lParam points to the standard message structure of type MSG, which contains the handle of the destination window, the message type, the wParam and lparams for the message, and the time and mouse position when the message was posted.

Since mouse messages are posted rather than sent to applications, RCHOOK's MsgHookProc can check for a right button press simply by check-

SetHook

```
//-----
// SetHook - Sets or Clears the message queue hooks
//-----
void SetHook (BOOL bEnable) {
    if (bEnable) {
        if (sHooked == 0) {
            lpfnNextHook = SetWindowsHook (WH_GETMESSAGE,
                                           GetProcAddress (hInst,
                                                             "MsgHookProc"));

            lpfnNextHook1 = SetWindowsHook (WH_CALLWNDPROC,
                                           GetProcAddress (hInst,
                                                             "CallHookProc"));

            sHooked++;
        }
    } else {
        if (sHooked) {
            UnhookWindowsHook (WH_GETMESSAGE,
                               GetProcAddress (hInst,
                                                             "MsgHookProc"));

            UnhookWindowsHook (WH_CALLWNDPROC,
                               GetProcAddress (hInst,
                                                             "CallHookProc"));

            sHooked--;
        }
    }
    return;
}
```

Figure 2: RCHOOK.DLL uses the SetHook procedure listed above to hook and unhook itself from the message queue.

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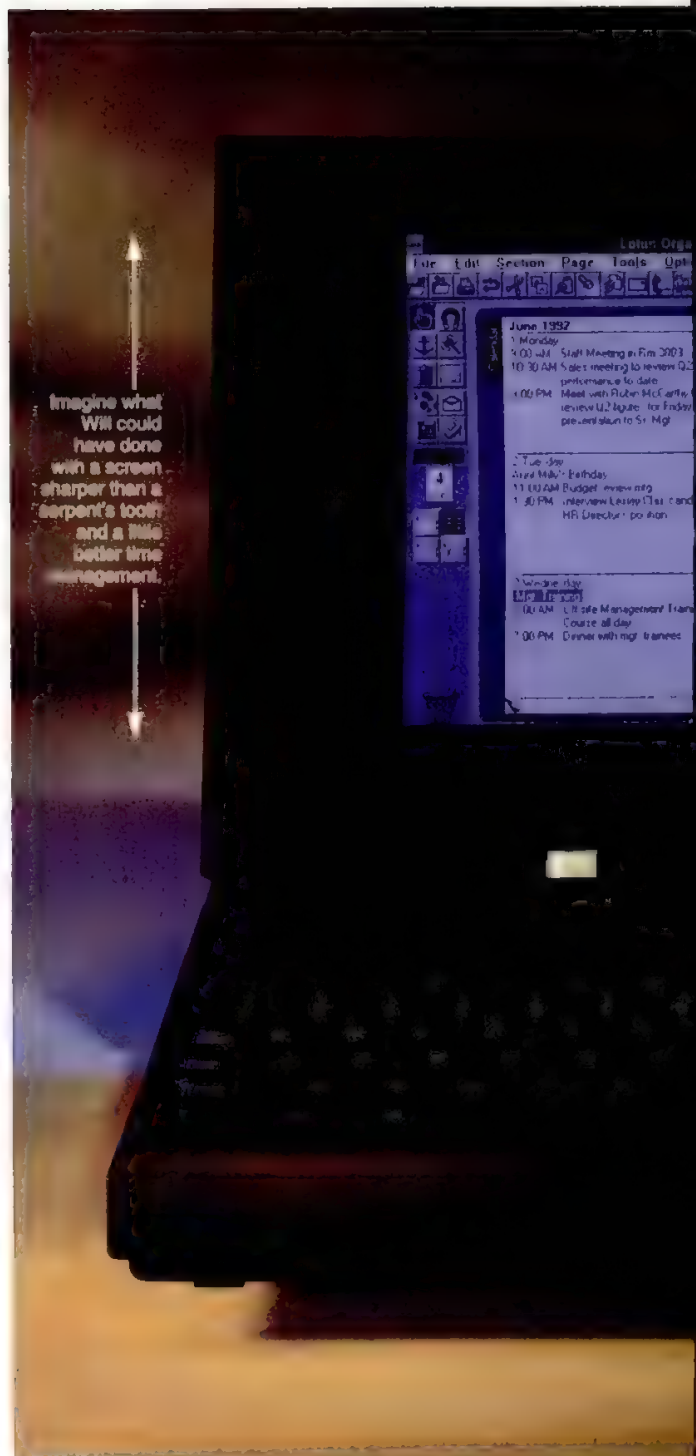


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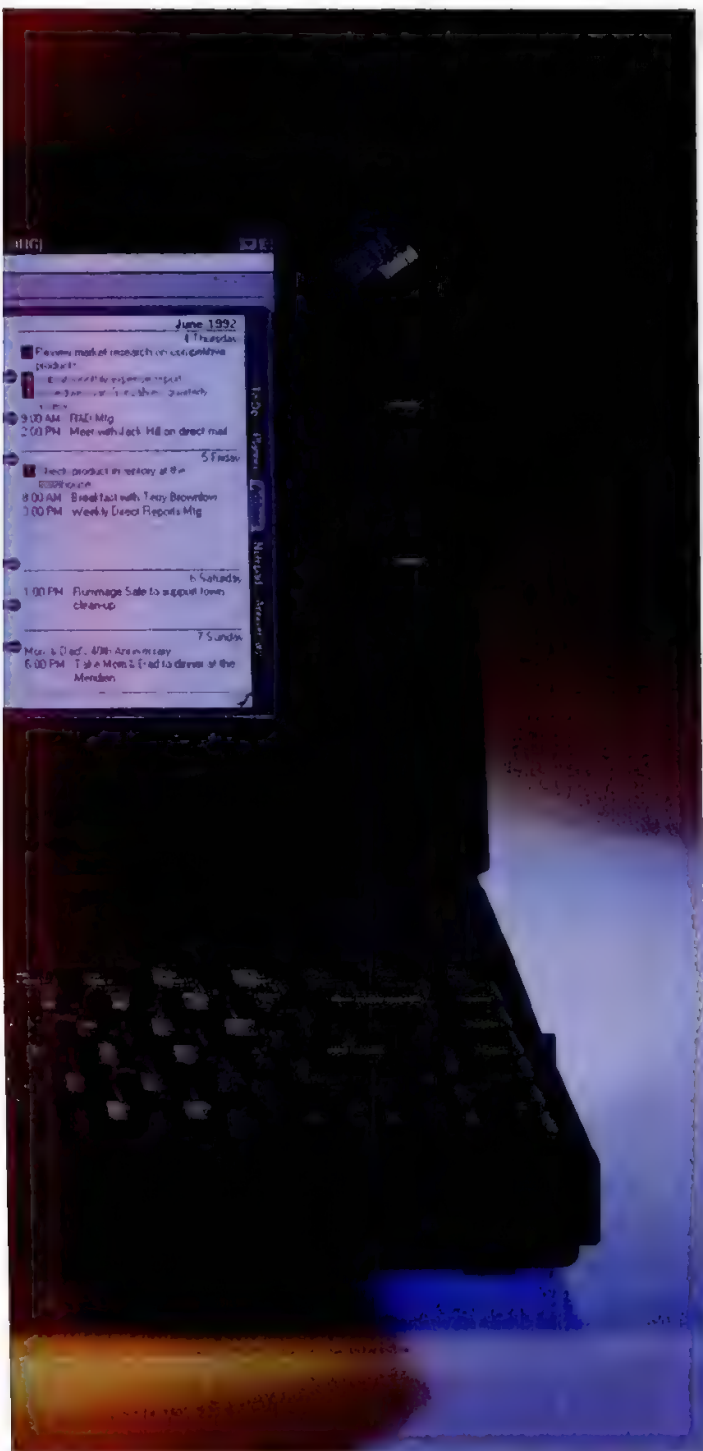
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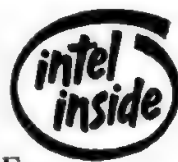
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eare would have ht to the coast.

ing for a WM_RBUTTONDOWN message. When a WM_RBUTTONDOWN message is detected, RCHOOK checks to see whether the message is being sent to an application that is on the No Pop list. If so, RCHOOK simply passes the message on and takes no action. If not, RCHOOK determines the handle of the window under the cursor and gets that window's menu handle by using the GetMenu API function.

Once the window menu handle has been obtained, the CreatePopupMenu API function is used to create an empty pop-up menu. The owner of the menu is set to the window over which the cursor is positioned, which I will call the *target window*. RCHOOK then uses the GetMenuItemID and GetMenuItemString API calls to query each item in the target window's menu.

As each item is queried, an identical item is added to the pop-up menu, using the AppendMenu API call. If the menu item is a normal text menu item, the text is simply copied to the new menu. The code that performs this function is contained in the RCHOOK CopyMenu procedure, which is listed in Figure 3.

There is one special case to be handled. If the menu item is a bitmap, CopyMenu calls another RCHOOK function, CopyMenuBitmap. CopyMenuBitmap queries Windows to determine the handle of the bitmap being used and places that bitmap in the menu.

After the pop-up menu has been filled in with the items from the target window's menu, an additional submenu is added to allow the user to access RCLICK's Configure and About dialog boxes. The pop-up menu is then displayed, using the TrackPopupMenu Windows API call. Since the owner of the pop-up menu is the target window, any selections from the pop-up menu are posted to the target window, avoiding any need for RCHOOK to forward the message.

When the user selects an item from the pop-up menu, RCHOOK's only remaining task is to check whether the menu item selected is one of the two items that were added to display the Configure and About dialog boxes. This is usually a simple matter of using the same message hook to check for a WM_COMMAND message with a menu ID matching one

of the IDs for these two additional menu items.

This process, which RCHOOK follows, works for *most* Windows applications. When either of the two items is detected, RCHOOK simply posts a message to RCLICK's main window to tell it to display the appropriate dialog box. The WM_COMMAND message is then modified to a WM_NULL message by writing 0 as the msg value in the message structure. The WM_NULL message is then ignored by the destination window when the message is processed.

There are a number of applications, however—Windows' help engine (WINHELP.EXE) among them—for which this normal process does not work. In these applications, the WM_COMMAND message is sent, not posted, to the application window. In that case the WM_COMMAND message does not pass through the MsgHookProc. To catch these WM_COMMAND messages, RCHOOK uses its second hook procedure, CallHookProc. CallHookProc is called by Windows any time a message is sent to a window. After detecting the WM_COMMAND message, CallHookProc acts on it in the same manner

as does MsgHookProc. That's to say, it simply posts a message to the RCLICK main window and changes the WM_COMMAND message to WM_NULL.

The remaining code in RCHOOK handles the interface between RCHOOK and RCLICK. RCLICK has five function calls available to it for controlling RCHOOK: GetStatus, SetStatus, GetNoPop, SetNoPop, and RemoveNoPop. The two status functions, GetStatus and SetStatus, allow RCLICK to enable and disable RCHOOK and to pass the handle of the RCLICK window to RCHOOK. GetNoPop and SetNoPop let RCLICK set and query the list of programs RCHOOK should avoid. Finally, RemoveNoPop allows RCLICK to tell RCHOOK to remove a program name from the No Pop list.

EXAMINING RCLICK.EXE RCLICK.EXE does everything except monitor the messages and display the pop-up menu. Among other things, RCLICK is responsible for creating the main RCLICK window and for displaying the Configure and About dialog boxes.

When RCLICK is first started, it checks to see whether a copy of itself is

CopyMenu

```
//-----
// CopyMenu - Copys the menu from a window to the popup menu
//-----
void CopyMenu (HMENU hPopupMenu, HMENU hSrcMenu) {
    int i, sMenuItems;
    UINT usMenuID, usMenuState;
    HMENU hSubMenu;

    sMenuItems = GetMenuItemCount (hSrcMenu);
    for (i = 0; i < sMenuItems; i++) {
        usMenuID = GetMenuItemID (hSrcMenu, i);
        usMenuState = GetMenuState (hSrcMenu, i, MF_BYPOSITION);
        if (usMenuID == 0xffff) {
            hSubMenu = CreatePopupMenu ();
            CopyMenu (hSubMenu, GetSubMenu (hSrcMenu, i));
            if (usMenuState & MF_BITMAP) {
                CopyMenuBitmap (hPopupMenu, MF_POPUP, hSubMenu);
            } else {
                GetMenuString (hSrcMenu, i, szStr, sizeof (szStr),
                    MF_BYPOSITION);
                AppendMenu (hPopupMenu, MF_POPUP, hSubMenu, szStr);
            }
        } else {
            if (usMenuState & MF_BITMAP) {
                CopyMenuBitmap (hPopupMenu, usMenuState, usMenuID);
            } else {
                GetMenuString (hSrcMenu, i, szStr, sizeof (szStr),
                    MF_BYPOSITION);
                AppendMenu (hPopupMenu, usMenuState, usMenuID, szStr);
            }
        }
    }
}
```

Figure 3: The CopyMenu procedure duplicates the choices in a menu bar in a pop-up menu that appears at the current location of the Windows cursor.

■ PC Magazine Utilities Updates

As with all good software, the programs presented in *PC Magazine* are upgraded and improved. Here's a partial list of the programs on PC MagNet that have been updated. To download these files from the Utilities/Tips Forum, type GO ZNT:TIPS, type LIB or select Libraries from the menu, then select Library 2 PCMAG UTILS. Type DOW and the filename listed below (for example, DOW ANSI.COM), or select Download a File from the menu.

ADDIT.COM, Version 1.1
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BAT2EXEC.COM, Version 1.5
BCOPY.COM, Version 1.2
BEN70.EXE, Benchmark 7.0
CARDFILE.COM, Version 1.1
CHKFRAG.EXE, Version 1.7
CONFIG.CTL, Version 3.0

DIRMATCH.COM, Version 3.1
EMMA.COM, Version 2.2
EMS40.SYS, Version 1.1
PCACCESS.EXE, Version 1.1
RN.COM, Version 3.0
SLICE.COM, Version 1.3
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For a list of the programs that are available on PC MagNet, download PCMCAT.ZIP from Library 1 (General Info) of the Utilities/Tips Forum.

A downloadable index to *PC Magazine's* product reviews is also available in Library 1 (General Info). PCM.EXE is a self-extracting file containing the Computer Library *PC Magazine* Reviews Index for January 1988 through December 1991. It requires the search files in PCSRCH.EXE.

already running. If so, it terminates. If not, it registers the RCLICK window class, creates the dialog box main window, and then modifies the ShowWindow parameter so that RCLICK starts as an icon instead of displaying the main window. RCLICK next reads RCLICK.INI to get the list of applications over which it should not pop up. As each program name is read, SetNoPop is called in RCHOOK.DLL to add that program's name to the list of applications to avoid. Since Windows loads RCHOOK.DLL automatically when RCLICK is started, RCLICK doesn't have to load or check for RCHOOK. Windows knows that RCLICK needs RHOOK because RHOOK is listed in the imported names table inside the RCLICK.EXE file.

The RCLICK window procedure is actually quite simple. Since the main window is a dialog box, the positions of child window controls (for example, the list box and push buttons) are predefined by the resource information linked to the .EXE file. Thus, when the window is created, using the CreateDialog API function, Windows creates all the child window controls for RCLICK. RCLICK's WinProc procedure processes only a few of the hundreds of window

messages; all the others are passed on to the Default window procedure, DefWindowProc.

When the RCLICK window is restored from an icon, RCLICK calls GetNoPop in RCHOOK for a list of the programs that are in the No Pop list. As each program name is returned, it is added to

***Windows' System Hooks
allow applications to
customize the Windows
environment, and
RCLICK shows the power
of these systemwide
message hooks.***

the No Pop dialog box.

WM_COMMAND messages are processed to perform the actions indicated when the user clicks on one of the buttons or selects an item in the list box. The routines that respond for each of the buttons are straightforward. Clicking the Disable button causes RCLICK to call

the SetStatus function in RCHOOK to unhook itself from the message queues. Once disabled, the text of the button is changed to Enable with the SetDlgItemText API call.

When the Remove button is clicked, the item currently selected is removed from the list box by sending LB_GETCURSEL, LB_GETTEXT and LB_DELETEITEM messages to the list box. If no item is currently selected, no action is taken.

Pressing the About button simply displays the About dialog box. When the Exit button is pressed RCLICK terminates by sending a WM_QUIT message to itself. When a WM_DESTROY message signals that the RCLICK window is about to be destroyed, RCLICK queries the list of No Pop applications from RCHOOK and saves their names in the RCLICK.INI file.

RCLICK also contains the procedures for displaying the About and Configure dialog boxes. The trivial About dialog procedure checks for the WM_COMMAND message indicating that the OK button has been pressed and terminates the dialog box.

The Configure dialog box queries and displays the application name and window title of the current window. It also displays the "Do not pop up on Window," "Disable RClick," and "Cancel" buttons. If the first of these three buttons is pressed, the name of the application is passed by SetNoPop to the RCHOOK DLL and the dialog box is closed. RCLICK disables RCHOOK and closes the dialog box when the Disable RClick button is pressed by using the SetStatus call. If the Cancel button is pressed, the Configure dialog box is closed with no action taken.

Windows' System Hooks allow applications to customize the Windows environment to suit the user's needs, and RCLICK provides an interesting example of the power of these systemwide message hooks. But aside from the usefulness as a programming example, RCLICK will provide welcome relief to all those well-traveled and weary mice. Try RCLICK and give your mouse a break! □

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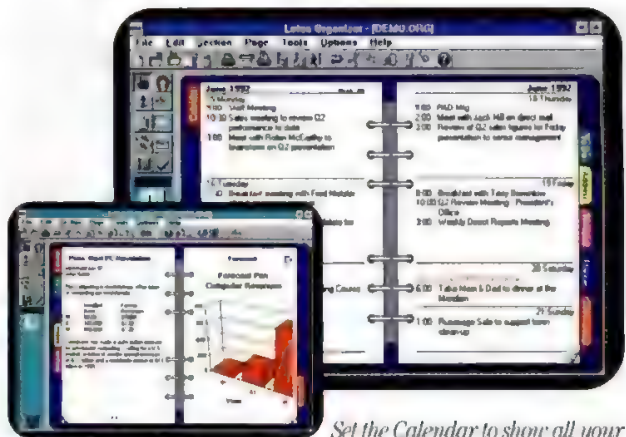
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Simplifying Bitmapped Font Selection in OS/2

BY CHARLES PETZOLD

I've always been impressed by the simplicity of font selection in PostScript. To begin using a 24-point Times Roman font, all you need are these statements:

```
/Times-Roman findfont
24 scalefont
set font
```

And why not? In classical typography, a font is specified simply by a face name and a point size, and that's the tradition PostScript follows.

In Windows and the OS/2 Presentation Manager, however, a data structure must be set up and passed to a font "creation" function. Although the selection of outline fonts—TrueType in Windows and Adobe Type 1 in the OS/2 PM—can be simplified, bitmapped fonts must often be enumerated from the system. This is particularly true in OS/2 because the font baseline extent and average character width must be specified exactly when you are choosing the bitmapped font you want.

In the last issue, we saw that performance and appearance were the important reasons for using bitmapped fonts under PM, and we learned how to enumerate them and select them for use. Before continuing our exploration, let's try to simplify bitmapped font selection with a couple of functions that hide some of the messy work.

WHAT DO WE WANT? Font selection in OS/2 won't ever be as simple as PostScript because there are more things to specify. Unlike outline fonts, bitmapped font attributes like italics or boldface are not part of the font typeface name. Instead, these variations are synthesized from the normal font. Also, OS/2 allows specifying underscore and strikeout attributes; PostScript does not.

Another problem is the code page, a

concept about which PostScript knows nothing. In PostScript, all fonts (except symbol and dingbat fonts) have the same character set. OS/2 fonts generally support a number of different ASCII and EBCDIC code pages for accented European languages. (EBCDIC was added for compatibility with IBM mainframes, which are just about the only computers in the western world that haven't standardized on ASCII.)

Bitmapped font selection in OS/2 isn't simple, but two functions and three structures in a sample module show how to simplify font-selection logic and make it more efficient.

Still, we should be able to uniquely specify an OS/2 bitmapped font with just four items:

- the face name (such as Tms Rmn);
- the point size (such as 12);
- attributes (italics, boldface, underscore, or strikeout); and
- the code page.

For example, you'd think we could create a function that would let us select a bitmapped font with a call such as

```
SelectBitmapFont ("Tms Rmn", 12,
FATTR_SEL_ITALIC, 0);
```

The function would select the 12-point Tms Rmn font. The FATTR_SEL_ITALIC constant is defined in OS2DEF.H for use with the FATTRS structure when calling the GpiCreate-

LogFont function. The last parameter in this example is set to 0 for a default code page.

Unfortunately, the process can't be quite that simple. As we saw in the last installment of this column, selecting a font for use in a Presentation Manager program is a two-step process. You first create a logical font using GpiCreateLogFont, at which time it is identified with a local ID number. You can then select that font for use in a presentation space by calling the GpiSetCharSet function.

When simplifying font selection in OS/2, it probably makes sense to retain the concept of the local ID. In this case, the best we can do is

```
CreateBitmapFont (hps, lcid,
"Tms Rmn", 12
FATTR_SEL_ITALIC, 0);
```

where the first parameter is the presentation space handle and the second parameter is the local ID. You can then select this font for use in a presentation space as usual:

```
GpiSetCharSet (hps, lcid);
```

In Chapter 5 of my book *Programming the OS/2 Presentation Manager* (Microsoft Press, 1988), I presented simplified OS/2 bitmapped font-creation functions that did something like this. The module was called EASYFONT, but it had a few deficiencies I'd like to correct here: First, the EASYFONT functions used a bunch of identifiers rather than the actual font name and the integral point size. When working with a font-creation function, it's probably easier to remember names and numbers than identifiers. Second, the EASYFONT functions only worked with the standard 17 bitmapped fonts (System Proportional, System Monospaced, Courier in three sizes, and

BMF.C

Complete Listing

```

/*-----
BMF.C -- Easy access to OS/2 bitmap fonts
(c) Charles Petzold, 1993
-----*/

#define INCL_GPI
#include <os2.h>
#include <stdlib.h>
#include <string.h>
#include "bmf.h"

static PFONTLIST pfl ;

PFONTLIST GetAllBitmapFonts (HPS hps)
{
    HDC          hdc ;
    int          iFace, iSize ;
    LONG         l, lFonts, xRes, yRes ;
    PFONTMETRICS pfm ;

    // Check for changed fonts

    if ((QPA_PUBLIC & GpiQueryFontAction (hps, QPA_PUBLIC)) && pfl != NULL)
        return pfl ;

    // Clean up old structure if necessary

    if (pfl != NULL)
    {
        for (iFace = 0 ; iFace < pfl->iNumFaces ; iFace++)
            free (pfl->faces[iFace].psizes) ;

        free (pfl) ;
    }

    // Determine the number of fonts

    lFonts = 0 ;
    lFonts = GpiQueryFonts (hps, QF_PUBLIC, NULL, &lFonts, 0, NULL) ;

    if (lFonts == 0)
        return NULL ;

    // Allocate memory for FONTMETRICS structures

    pfm = (PFONTMETRICS) calloc (lFonts, sizeof (FONTMETRICS)) ;

    if (pfm == NULL)
        return NULL ;

    // Get all fonts

    GpiQueryFonts (hps, QF_PUBLIC, NULL, &lFonts,
        sizeof (FONTMETRICS), pfm) ;

    // Determine font resolution

    hdc = GpiQueryDevice (hps) ;

    DevQueryCaps (hdc, CAPS_HORIZONTAL_FONT_RES, 1, &xRes) ;
    DevQueryCaps (hdc, CAPS_VERTICAL_FONT_RES, 1, &yRes) ;

    // Allocate memory for FONTLIST structure

    pfl = malloc (sizeof (FONTLIST)) ;
    pfl->iNumFaces = 0 ;

    // Loop through all fonts

    for (l = 0 ; l < lFonts ; l++)
    {
        // Check if bitmap font at screen resolution

        if ((pfm[l].fsDefn & FM_DEFN_OUTLINE) &&
            pfm[l].sXDeviceRes == xRes &&
            pfm[l].sYDeviceRes == yRes)
        {
            // Loop through existing facenames

            for (iFace = 0 ; iFace < pfl->iNumFaces ; iFace++)
                if (0 == strcmp (pfl->faces[iFace].szFacename,
                    pfm[l].szFacename))
                    break ;

            // If new face, reallocate FONTLIST structure

            if (iFace == pfl->iNumFaces)
            {
                pfl = realloc (pfl, sizeof (FONTLIST) *
                    (pfl->iNumFaces + 1)) ;
                pfl->iNumFaces++ ;

                strcpy (pfl->faces[iFace].szFacename, pfm[l].szFacename) ;

                pfl->faces[iFace].iNumSizes = 0 ;
                pfl->faces[iFace].psizes = NULL ;
            }

            iSize = pfl->faces[iFace].iNumSizes ;
            pfl->faces[iFace].iNumSizes++ ;

            pfl->faces[iFace].psizes = realloc (pfl->faces[iFace].psizes,
                pfl->faces[iFace].iNumSizes * sizeof (SIZES)) ;

            // Store point size and lMatch value

            pfl->faces[iFace].psizes[iSize].iPointSize =
                pfm[l].sNominalPointSize / 10 ;

            pfl->faces[iFace].psizes[iSize].lMatch = pfm[l].lMatch ;
        }

        // Clean up

        free (pfm) ;
    }

    return pfl ;
}

LONG CreateBitmapFont (HPS hps, LONG lcid, char * szFacename,
    int iPointSize, SHORT fsAttributes, SHORT usCodePage)
{
    FATTRS fat ;
    int iFace, iSize ;

    fat.usRecordLength = sizeof (FATTRS) ;
    fat.fsSelection = fsAttributes ;
    fat.lMatch = 0 ;
    fat.szFacename[0] = '\0' ;
    fat.idRegistry = 0 ;
    fat.usCodePage = usCodePage ;
    fat.lMaxBaselineExt = 0 ;
    fat.lAveCharWidth = 0 ;
    fat.fsType = 0 ;
    fat.fsFontUse = 0 ;

    // If fonts have changed, re-enumerate them

    GetAllBitmapFonts (hps) ;

    // If bitmap fonts are available, loop through faces

    if (pfl != NULL)
        for (iFace = 0 ; iFace < pfl->iNumFaces ; iFace++)
        {
            // If a face matches, loop through sizes

            if (0 == strcmp (szFacename, pfl->faces[iFace].szFacename))
                for (iSize = 0 ; iSize < pfl->faces[iFace].iNumSizes ;
                    iSize++)
                {
                    // If size matches, setup FATTR structure

                    if (iPointSize ==
                        pfl->faces[iFace].psizes[iSize].iPointSize)
                    {
                        strcpy (fat.szFacename,
                            pfl->faces[iFace].szFacename) ;

                        fat.lMatch =
                            pfl->faces[iFace].psizes[iSize].lMatch ;
                    }

                    // Create the font

                    return GpiCreateLogFont (hps, NULL, lcid, &fat) ;
                }
        }
}

```



Figure 1: This program includes two functions to simplify font enumeration and selection.

Helv and Tms Rmn each in six sizes). It's best if such a function can accommodate any other bitmapped fonts that happened to be installed on the system.

Finally, although EASYFONT retained enough information to create the

logical font, this information was not available to a program using the EASYFONT functions. Thus, even if EASYFONT were able to allow selection of bitmapped fonts other than the standard 17, there wasn't a way for the program to find

out what they were without doing its own font enumeration.

A BETTER APPROACH So let's see if we can fix some of these problems, while making it a point to retain the minimum information necessary to create the font.

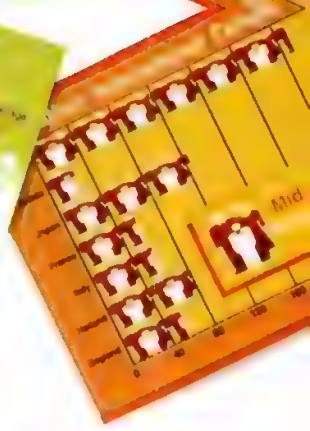
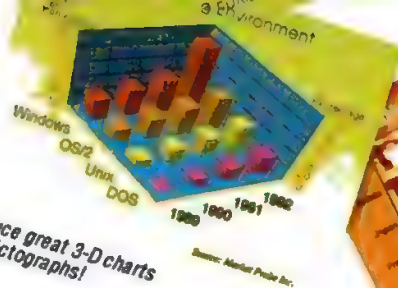
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BMF.H

Complete Listing



```

/*-----
BMF.H -- Easy access to OS/2 bitmap fonts
(c) Charles Petzold, 1993
-----*/

typedef struct
{
    int iPointSize ;
    LONG lMatch ;
}
SIZES ;

typedef SIZES * PSIZES ;

typedef struct
{
    char szFacename [FACESIZE] ;
    int iNumSizes ;
    PSIZES psizes ;
}
FACES ;

typedef struct
{
    int iNumFaces ;
    FACES faces [1] ;
}
FONTLIST ;

typedef FONTLIST * PFONTLIST ;

PFONTLIST GetAllBitmapFonts (HPS hps) ;

LONG CreateBitmapFont (HPS hps, LONG lcid, char *
    int iPointSize, SHORT fsAttributes, SHORT usCodePage) ;

```

Figure 2: The BMF header file defines the structures and functions used in BMF.C.

You'll recall in the last issue that we saved the entire FONTMETRICS structure for every bitmapped font. (The array of FONTMETRICS structures comes from the GpiQueryFonts font-enumeration function.) This is overkill; we can make do with a lot less information.

Part of the secret is making use of the lMatch field that shows up in both the FONTMETRICS structure obtained from GpiQueryFonts and the FATTRS (font attributes) structure used to define the desired font when calling GpiCreateLogFont. The lMatch field in the FONTMETRICS structure is simply a number that uniquely identifies each font available in a presentation space. You can use this number to set the lMatch field in the FATTRS to pick that particular font.

Unfortunately, it turns out that using lMatch is not quite as helpful as it should be. When using lMatch, you don't have to fill in the lMaxBaselineExt and lAveCharWidth fields of the FATTRS structure, so you don't have to maintain that information to recreate the font. But you must still fill in the szFacename field. The

only other required field in FATTRS is usRecordLength (the length of the structure). Optionally, you can use fsSelection for font attributes (italics, boldface, underline, and strikeout) and usCodePage to pick a nondefault code page.

The module that implements the font enumeration and simplified selection logic is BMF.C, shown in Figure 1. (BMF stands for bitmapped Fonts). To use this

module, include the BMF.H header file shown in Figure 2 in your program.

BMF.H defines the two functions and three structures used for storing information about the enumerated bitmapped fonts. The GetAllBitmapFonts function enumerates the fonts and stores the information. CreateBitmapFont has the syntax I discussed earlier.

THE STORAGE STRUCTURES To allow the versatile storage of information about the enumerated bitmapped fonts, I defined three structures in BMF.H. During the process of font enumeration, memory for these structures is dynamically allocated and reallocated.

In reverse order as defined in BMF.H, the main structure is called FONTLIST. The first field (iNumFaces) is the number of typeface names. This is followed by an array of FACES structures, one for each face name. The FACES structure stores the face name in the szFacename field. This is followed by the iNumSizes field, which stores the number of point sizes available for that typeface name. The third field is a pointer to an array of SIZES structures. Each FACES structure is 40 bytes in size.

The SIZES structure contains the point size (derived from the sNominalPointSize field of the FONTMETRICS structure) and the lMatch value, also from FONTMETRICS. The SIZES structure is allocated as an array, so it uses 8 bytes for each point size of a particular typeface name.

By calling GetAllBitmapFonts, a program can obtain a pointer to the FONTLIST structure, find all the available typeface names, and the available point

BITFONT2.MAK

Complete Listing

```

#-----
# BITFONT2.MAK make file
#-----

bitfont2.exe : bitfont2.obj bmf.obj bitfont2.def bitfont2.res
    link386 /BASE:0x10000 bitfont2 bmf,, NUL,, bitfont2
    rc bitfont2.res

bitfont2.obj : bitfont2.c bitfont2.h
    gcc -C -Kbcpr -Ss bitfont2.c

bmf.obj : bmf.c bmf.h
    gcc -C -Kbcpr -Ss bmf.c

bitfont2.res : bitfont2.rc bitfont2.h bmf.h
    rc -r bitfont2.rc

```

Figure 3: This is the make file to use with the IBM C compiler.



sizes for each. This can be useful for building a menu or dialog box that allows the user to select a particular bitmapped font. Or, to use one of the standard 17 bitmapped fonts, a program can simply call `CreateBitmapFont` with the desired name, size, and attributes.

THE BMF CODE Now let's take a look at `BMF.C` to examine how these two

functions are implemented. Notice that the program contains a global variable (named `pfl`) that is defined as a pointer to a `FONTLIST` structure.

`GetAllBitmapFonts` begins by calling the `GpiQueryFontAction` function to determine if fonts have changed since the last time the function was called. (The first time the function is called, it indi-

cates that fonts have been changed.) If fonts have not changed, and `pfl` is not `NULL`, the function simply returns the existing `pfl` pointer. Otherwise it continues, possibly freeing up the memory allocated in a previous call.

The next few lines should be familiar from the other programs that enumerated fonts, shown in this column. The first

BITFONT2.C

Complete Listing

```

/*-----
BITFONT2.C -- Displays OS/2 Bitmap Fonts
(c) Charles Petzold, 1993
-----*/

#define INCL_WIN
#define INCL_GPI
#include <os2.h>
#include <stdio.h>
#include <string.h>
#include "bitfont2.h"
#include "bmf.h"

#define LCID_FONT 1

MRESULT EXPENTRY ClientWndProc (HWND, ULONG, MPARAM, MPARAM) ;

int main (void)
{
    static CHAR szClientClass [] = "BitFont2" ;
    static ULONG flFrameFlags = FCF_TITLEBAR | FCF_SYSMENU |
                                FCF_SIZEBORDER | FCF_MINMAX |
                                FCF_SHELLPOSITION | FCF_TASKLIST |
                                FCF_MENU ;

    HAB hab ;
    HMQ hmq ;
    HWND hwndFrame, hwndClient ;
    QMSG qmsg ;

    hab = WinInitialize (0) ;
    hmq = WinCreateMsgQueue (hab, 0) ;

    WinRegisterClass (hab, szClientClass, ClientWndProc, CS_SIZEREDRAW, 0) ;

    hwndFrame = WinCreateStdWindow (HWND_DESKTOP, WS_VISIBLE,
                                    &flFrameFlags, szClientClass,
                                    "Bitmap Fonts", 0L,
                                    NULLHANDLE, ID_RESOURCE, &hwndClient) ;

    while (WinGetMsg (hab, &qmsg, NULLHANDLE, 0, 0))
        WinDispatchMsg (hab, &qmsg) ;

    WinDestroyWindow (hwndFrame) ;
    WinDestroyMsgQueue (hmq) ;
    WinTerminate (hab) ;
    return 0 ;
}

MRESULT EXPENTRY ClientWndProc (HWND hwnd, ULONG msg, MPARAM mp1, MPARAM mp2)
{
    static BOOL fItalic, fUnder, fStrike, fBold ;
    static HWND hwndMenu ;
    static SHORT cyClient ;
    CHAR szBuffer [PAGESIZE * 32] ;
    FONMETRICS fm ;
    HPS hps ;
    int iFace, iSize ;
    PFONTLIST pfl ;
    POINTL ptl ;

    switch (msg)
    {
        case WM_CREATE:
            hwndMenu = WinWindowFromID (WinQueryWindow (hwnd, GW_PARENT),
                                         FID_MENU) ;
            return 0 ;

        case WM_SIZE:
            cyClient = HIUSHORT (mp2) ;
            return 0 ;

        case WM_COMMAND:
            switch (COMMANDMSG (&msg)->cmd)
            {
                case IDM_ITALIC: fItalic = ! fItalic ; break ;
                case IDM_UNDERSCORE: fUnder = ! fUnder ; break ;
                case IDM_STRIKEOUT: fStrike = ! fStrike ; break ;
                case IDM_BOLD: fBold = ! fBold ; break ;

                default: return 0 ;
            }

            WinCheckMenuItem (hwndMenu, COMMANDMSG (&msg)->cmd,
                              ! WinIsMenuItemChecked (hwndMenu, COMMANDMSG (&msg)->cmd)) ;

            WinInvalidateRect (hwnd, NULL, TRUE) ;
            return 0 ;

        case WM_PAINT:
            hps = WinBeginPaint (hwnd, NULLHANDLE, NULL) ;

            GpiErase (hps) ;

            // Get the font list

            pfl = GetAllBitmapFonts (hps) ;

            // Set POINTL structure to upper left corner of client

            ptl.x = 0 ;
            ptl.y = cyClient ;

            // Loop through all the bitmap fonts

            for (iFace = 0 ; iFace < pfl->iNumFaces ; iFace++)
            {
                for (iSize = 0 ; iSize < pfl->faces[iFace].iNumSizes ; iSize++)
                {
                    // Create the logical font and select it

                    CreateBitmapFont (hps, LCID_FONT,
                                      pfl->faces[iFace].szFacename,
                                      pfl->faces[iFace].psizes[iSize].iPointSize,
                                      (fItalic ? FATTR_SEL_ITALIC : 0) |
                                      (fUnder ? FATTR_SEL_UNDERSCORE : 0) |
                                      (fStrike ? FATTR_SEL_STRIKEOUT : 0) |
                                      (fBold ? FATTR_SEL_BOLD : 0),
                                      0) ;

                    GpiSetCharSet (hps, LCID_FONT) ;

                    // Query the font metrics of the current font

                    GpiQueryFontMetrics (hps, sizeof (FONMETRICS), &fm) ;

                    // Set up a text string to display

                    sprintf (szBuffer, "%s - %d points",
                            pfl->faces[iFace].szFacename,
                            pfl->faces[iFace].psizes[iSize].iPointSize) ;

                    // Drop POINTL structure to baseline of font

                    ptl.y += fm.lMaxAscenter ;

                    // Display the character string

                    GpiCharStringAt (hps, &ptl, strlen (szBuffer), szBuffer) ;

                    // Drop POINTL structure down to bottom of text

                    ptl.y += fm.lMaxDescender ;

                    // Select the default font; delete the logical font

                    GpiSetCharSet (hps, LCID_DEFAULT) ;
                    GpiDeleteSetId (hps, LCID_FONT) ;
                }

                WinEndPaint (hps) ;
                return 0 ;

            case WM_DESTROY:
                return 0 ;
            }

            return WinDefWindowProc (hwnd, msg, mp1, mp2) ;
    }
}

```

Figure 4: This is the source code for the `BITFONT2` program.



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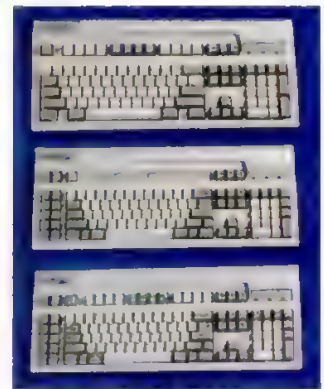
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step is to call `GpiQueryFonts` to obtain the number of fonts, and then again to obtain the fonts as an array of `FONTMETRICS` structures. The function also calls `DevQueryCaps` to obtain the font resolution of the screen.

`GetAllBitmapFonts` then allocates memory for the `FONTLIST` structure. As defined, the `FONTLIST` structure contains an array of only one `FACES` structure. The structure will be reallocated for each additional typeface name as the function continues enumerating fonts. Looping through all the fonts, the function checks whether the font is a bitmapped font and has the correct resolution for the video display. If so, it then checks to see if the typeface name has already been stored. If not, the `FONTLIST` structure is reallocated to include a new face name, and the information about the font is stored. A `SIZES` structure must also be allocated (or reallocated) to store the point size of the font and the `lMatch` value.

BITFONT2.H

Complete Listing

```
/*-----
  BITFONT2.H header file
  -----*/

#define ID_RESOURCE      1

#define IDM_ATTRS        10
#define IDM_ITALIC        11
#define IDM_UNDERSCORE    12
#define IDM_STRIKEOUT     14
#define IDM_BOLD          15
```



Figure 5: This header file defines constants used in BITFONT2'S C source code and resource script.

BITFONT2.RC

Complete Listing

```
/*-----
  BITFONT2.RC resource script file
  -----*/

#include <os2.h>
#include "bitfont2.h"

MENU ID_RESOURCE
{
  SUBMENU "Attributes",    IDM_ATTRS
  {
    MENUITEM "Italic",      IDM_ITALIC
    MENUITEM "Underscore",  IDM_UNDERSCORE
    MENUITEM "Strikeout",   IDM_STRIKEOUT
    MENUITEM "Bold",        IDM_BOLD
  }
}
```



Figure 6: The resource script shown above defines the BITFONT2 program's menu.

BITFONT2.DEF

Complete Listing

```
/*-----
  BITFONT2.DEF module definition file
  -----*/

NAME            BITFONT2  WINDOWAPI

DESCRIPTION      'Bitmap Fonts in OS/2 2.0 PM (c) Charles Petzold, 1993'
PROTMODE
```



Figure 7: This is BITFONT2's module definition file.

When the function is done, six memory blocks will have been allocated for the font information of the 17 standard fonts—one `FONTLIST` structure that has an array of five `FACES` structures for the five typeface names, and five `SIZES` structures that contain an array of point sizes and `lMatch` values for each face.

The `CreateBitmapFont` function begins by setting up a `FATTRS` structure. Two of the fields—`fsSelection` and `usCodePage`—can be set from the `fsAttributes` and `usCodePage` parameters to the function. Next, `CreateBitmap` loops through all the typeface names in the `FONTLIST` structure and checks for a match with the `szFacename` parameter to the function. If a match is found, the function then loops through all the point sizes and checks for a match with the `iPointSize` parameter. If the point size also matches, then the `szFacename` and `lMatch` fields of the `FATTRS` structure can be set. The function concludes by simply calling `GpiCreateLogFont` with the `FATTRS` structure, and the `hps` and `lcid` parameters, to the `CreateBitmapFont` function.

LISTING THE FONTS In the last issue we looked at a program called `BITFONTS` that enumerated and listed all the bitmapped fonts. A simplified second version of this program (called `BITFONT2`) is shown in Figures 3 through 7. You can download `BITFONT2` and `BMF` from the Programming Forum on PC Magnet archived as `BITFO2.ZIP`.

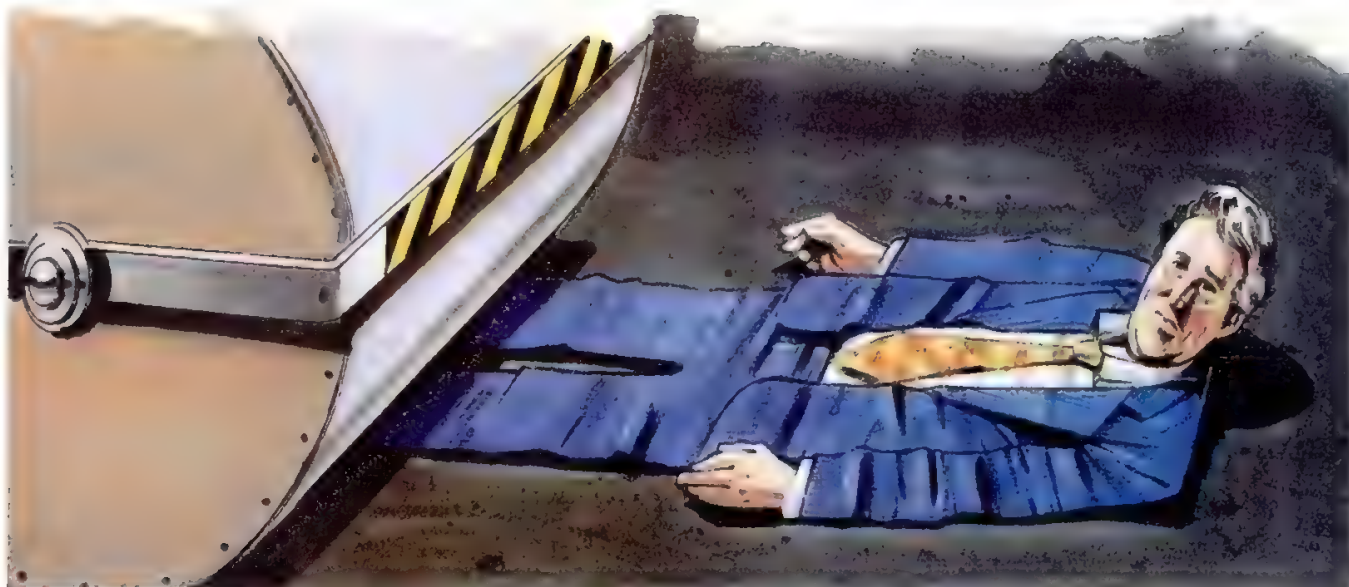
`BITFONT2` is further simplified by making use of the two functions in `BMF`. During the `WM_PAINT` message, the program obtains a pointer to the `FONTLIST` structure by calling `GetAllBitmapFonts`. It loops

through all the typeface names and the point sizes for each face, then calls `CreateBitmapFont`.

After this, everything else is routine. The program calls `GpiSetCharSet` to select the font into the presentation space and `GpiQueryFontMetrics` to obtain the metrics information, and then displays some text showing the typeface name and the point size.

COMING UP With the simplified font selection logic in place, we can begin exploring some things we can do with bitmapped fonts. Bitmapped fonts are not nearly as versatile as outline fonts, of course, but there are a few things to learn. As I've indicated before, though, part of the challenge in working with the OS/2 Presentation Manager is figuring out what works and what doesn't! One function I wanted to use in the last issue was `GpiSetTextAlignment`. When displaying text, you specify a point at which the text is to begin. This point is the left side of the text string at the baseline. For the `BITFONTS` program, this was a little awkward for displaying the successive lines of text. For each font, I had to decrement a y-coordinate based on the maximum height of the font above the baseline, and—after displaying the text—decrement it again based on the maximum descent of the font below the baseline.

In theory, `GpiSetTextAlignment` would have made this a little easier. The function allows changing the meaning of the point at which text begins. You can set it so it indicates the left, center, or right of the text string; or the top, bottom, or baseline. It turns out, however, that `GpiSetTextAlignment` returns an error code that indicates that the function is not supported! In the next issue, we'll look at a few font functions that *are* supported under OS/2 2.0. □



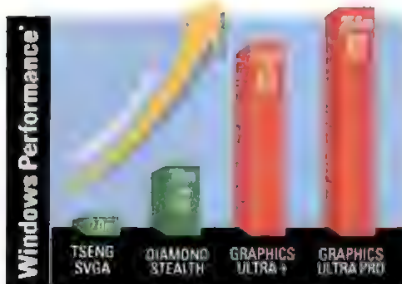
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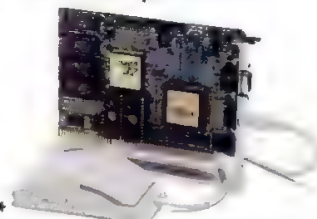
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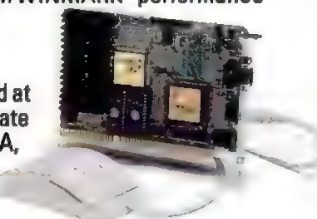
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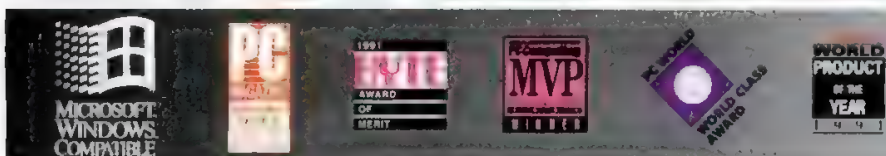
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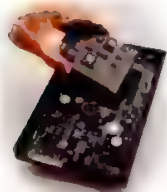
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Exploring Windows NT Executable Files

BY RAY DUNCAN

Despite the fact that I've spent the last couple of years trying to learn the basics of GUI application programming, I'm still a kernel guy at heart. I don't really feel comfortable with a new operating system until I've tried out every one of its functions for file, memory, and process management; until I've experimented with the system's different mechanisms for interprocess communication; until I comprehend how the system is organized into modules and layers; and until I know exactly how the kernel talks to its device drivers and how application programs talk to the kernel. Given a complex environment like RSX-11M, Unix, OS/2, or Windows NT, poking a nose into each of a system's nooks and crannies in my "spare" time can easily turn into a project that requires a couple of years.

A crucial step in my self-imposed operating system-familiarization process is coming to grips with, and thoroughly understanding, the structure of an executable file within the system. You may think this a senseless waste of time in this era of increasing abstraction, with high-level languages and object-oriented user interfaces becoming the norm, and assembly language programming (not to mention machine language programming!) fast becoming a lost art. But the dissection of executable files can give you insight into many different aspects of an operating system's architecture and operation, ranging from process creation to virtual memory. And, of course, it's mandatory if you're engaged (as I am) in the design of programming tools that must function within the system or participate in the generation of other executable files for the system.

Unfortunately, Microsoft's and IBM's track records for facilitating this sort of

snooping into executable files under DOS, Windows, and OS/2 has not been good at all. In fact, I have often gotten the impression that the executable file formats of these three systems owe at least as much to convenient hacks and happy accidents as they do to any sort of purposeful design.

The DOS real-mode MZ executable format was not only poorly documented, it was inconsistently implemented. (For example, the checksum field in the file header has always been ignored by the

Deciphering the structure of executable files is crucial to understanding an operating system. Here we look at the Unix COFF file format, the basis of Windows NT executables.

DOS program loader, resulting in some linkers calculating it differently from others, while some of them don't bother to calculate it at all.)

The Windows NE segmented executable file format underwent silent but significant mutations with each new release of Windows, and it was never completely and officially documented until after the release of Windows 3.0. The OS/2 1.x NE executable file format was a sparsely documented variation on the Windows NE format, and it also underwent silent (that is, undocumented) but important modifications with each new version of OS/2 up until OS/2 1.3. The OS/2 2.0 LE 32-bit executable format was an oddball superset of the OS/2 1.x 16-bit format (never docu-

mented anywhere except in a C header file so far as I am aware); and the LE format diverged into the LX format of IBM's OS/2 2.0 and the LE format of Windows 3.0's Virtual Device Drivers (VxDs).

When I finally got around to examining the internals of Windows NT's executable files, I fully expected, on the basis of past experience, to find yet another hack of the NE or LE formats. Much to my amazement, beyond the real-mode "stub" program at the beginning of the files (that little program that gives you a slap on the wrist if you attempt to run a protected-mode application under MS-DOS), there was virtually nothing that looked familiar. To my further amazement, after pondering the linker switches and conversion utilities invoked in Microsoft's example make files, I discovered that Microsoft had actually adopted an executable file format for Windows NT that was Not Invented Here (in Redmond). To wit, the Windows NT PE (portable executable) file format is actually a superset of the Unix System V Common Object File Format (COFF). Figure 1 shows a somewhat idealized executable file family tree.

THE COFF FILE FORMAT On Intel processors, we've all become accustomed to some inconvenient but seemingly inescapable facts of life: Object modules produced by language translators have a bizarre bit-stream format that is closely tied to the hardware architecture and the processor mode; object modules, libraries, and executable files have virtually nothing in common internally; operating systems from different vendors that run on the same processor have mutually incompatible executable file formats; debuggers from different vendors require proprietary debugging information formats that are, again, incompatible—and the list goes on.

Executable File Family Tree

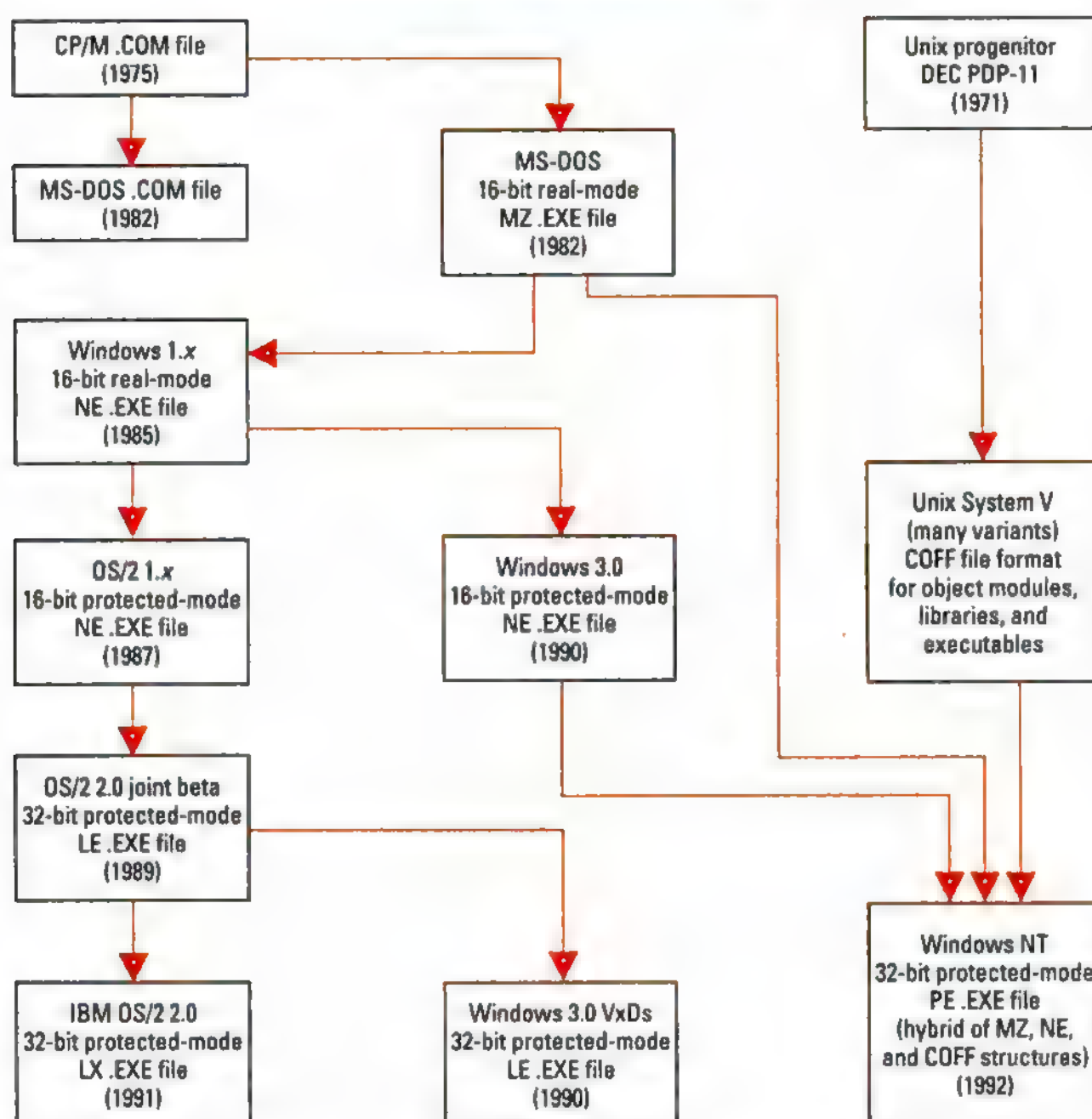


Figure 1: This shows the derivation of the Windows NT PE (portable executable) file format. (Dates indicate approximately when file formats were first used.)

Most of us have become so acclimated to this situation, in fact, that we now take it for granted. The entire DOS system-tools market was rocked to its foundations when Borland decided to document Turbo Debugger's symbol-table format for other software vendors; developers had become so used to reverse-engineering Microsoft's CodeView symbol formats that they simply considered this a routine chore and part of the overhead of doing business.

The Unix community took a different road. This was partly possible, I believe, because the Unix installed base was so small for many years, and because Unix programs traditionally have nearly all been written in high-level languages with broad access to source code. But we must also give the Unix elite credit for long-range vision and concern for standardization and reuse of tools that is rarely, if ever, encountered in our world of DOS, Windows, and OS/2. Executable pro-

grams on any Unix System V host, no matter what the processor, are all represented in the COFF file format (the machine code and relocation records in the file, of course, are processor-dependent). Moreover, object modules, libraries, and executable files all share the same COFF structure.

From a DOS programmer's point of view, the pervasive use of COFF under Unix has incredible implications. For example, the conversion of an object module into an executable file—assuming that there are no unresolved external references in the object module—requires little more than setting a few flags in the COFF file header. Incremental linking and shared code libraries (which are the Unix counterpart to dynamic link libraries) come practically for free. And the concept of writing linkers and symbolic debuggers that can be easily ported from one processor architecture to another is not merely a fantasy but rather an accom-

plished fact.

Why did the Microsoft Windows NT development team adopt the COFF format instead of cooking up their own executable file format or mangling the existing Microsoft/IBM NE, LE, or LX formats? My own guess is that this unprecedented event had two main causes. First, the Windows NT development effort was headed by "outsiders" with many years of experience building industrial-grade operating systems and (presumably) little patience with the "Not Invented Here" syndrome.

Second, the Windows NT team was strongly motivated to make the system as portable as possible, and using COFF would allow them to leverage the existing Unix programming tools on various RISC processors. Some fundamental problems with the OS/2 2.0 LE executable format probably played a role as well, such as its many Intel-oriented bitfields and structures, its unsuitability for memory mapping by the system loader, and its vestigial elements that play no useful role in a 32-bit paged environment.

COFF FILE OVERVIEW COFF may be ubiquitous under Unix, but written explanations of COFF are very hard to come by. Since Unix programmers are accustomed to writing everything in C and moving their programs with ease from one processor running Unix to another, only the Unix programming tools wizards and authors of Unix worms or viruses pay much attention to executable file formats. When I first perceived the need to learn about COFF, I looked through several cubic feet of Unix books and even

*From a DOS
programmer's point of
view, the pervasive use of
COFF under Unix has
incredible implications.*

(out of sheer exasperation) browsed through the source code for some of the GNU programming tools before stumbling on the little book *Understanding and Using COFF* from O'Reilly and Associates (see the Further Reading section

A COFF Executable File

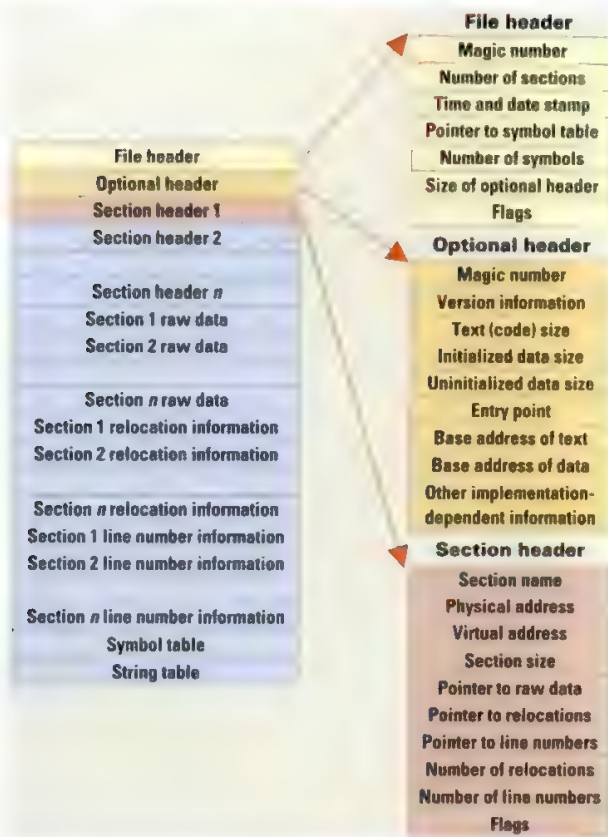


Figure 2: This shows the structure of a Unix System V COFF executable file.

below for more details).

The COFF file format has its origins in the *a.out* executable file produced by the BSD Unix linker. The structure of a COFF file can be quite elaborate but is built out of relatively simple elements, and nearly every COFF file shares, at minimum, the overall structure shown in Figure 2. The file begins with a relatively short structure called the file header; the fields of this structure include a *magic number* that identifies the target processor, the number of *sections* in the file (more about this in a moment), a time stamp, a pointer to the file's symbol table (if any), and some flags.

If the file is executable, the file header is followed by an optional header that contains various information that is of interest to the system loader. The optional header also starts with a magic number that is always written in Unix documentation as octal 0413. (The fact that this number is expressed in octal—the preferred notation in DEC PDP-11 systems—and that it strongly resembles a PDP-11

relocation information for the corresponding section, the virtual load address for the section, various flags, and (optionally) a pointer to line number information for the section that can be used by symbol debuggers. The actual sections of the file follow the entire set of section headers and do not inherently need to be in any particular order.

Symbol and line number information lies at the end of the file. Some of this information falls away as object modules are linked together and external references become resolved, and the rest can be stripped off to reduce the size of the final executable file if debugging information is not needed. In general, there are three important things to note about the COFF format:

- COFF assumes a 32-bit processor, so structures are aligned on 4-byte boundaries;
- COFF doesn't care at all about byte order (although of course the processor does!);
- COFF assumes a paged virtual memory

branch opcode leads me to suspect that this magic number has a lineage going right back to the original Unix systems at Bell Labs.)

The next element of the file is a series of section headers, one for each section in the body of the file. Nearly every COFF file contains a minimum of three sections (and thus has a minimum of three section headers): a section called *.text*, which contains machine code; a section called *.data*, which contains initialized data; and a section that is called *.bss*, which contains uninitialized data. A particular section header contains the section name, pointers to the machine code or data and the

environment with the possibility of write-protection.

SPELUNKING IN WINDOWS NT PE FILES

Windows NT PE files are a true superset of the COFF format, which is lucky because, in accordance with Microsoft tradition, the official documentation of the PE file format verges on being invisible. One of the software development kit header files, WINNT.H, contains some structure definitions for PE files, but these structures are not comprehensive and at least one of them appears to be completely bogus. The NT manuals are silent on the subject, and the recently released book *Inside Windows NT* by Helen Custer doesn't exactly have a lot of entries for PE or COFF in the index, either. Still, with what we already know of COFF, what we know of Windows 3.x resources and executable files, and what we surmise about the things that the Windows NT system has to be doing in order to load and execute a program (such as dynamic linking), we can puzzle out just about everything we need to know about the PE format.

A PE file starts with the familiar old

A Windows NT Executable File

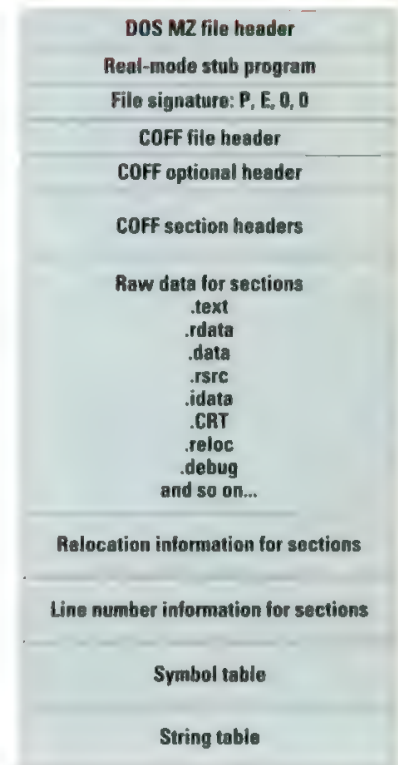


Figure 3: This is the structure of a Windows NT executable file.



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DOS real-mode MZ file header and stub program. Following the stub program is a special 4-byte signature consisting of the characters PE and two 0 bytes, then the COFF file header structure, the COFF optional header structure (expanded with many NT-specific fields), and the section headers, as shown in Figure 3. PE files have many more sections than the average Unix COFF file, including sections named .idata, .rsrc, .rdata, and .CRT, but since the overall blueprint for a COFF file is so well defined, the presence of these "new" sections has almost no impact on the parts of the file we already understand. The file ends with a clump of symbol and line number information that is typically on the order of ten times the size of the executable portion of the file.

Let me give you an example of how the mysterious portions of the file can be attacked and deciphered. I first compiled a very simple "Hello World" program without debugging information (to keep the file small), then used the DUMP utility from my OS/2 book to create a hard

copy hex ASCII listing of the file's contents. Working from the description of the COFF format in the O'Reilly book, I identified the COFF file header, optional header, and section headers, and then used the information in the section headers to delimit each of the actual file sections by outlining them in pencil. The section that was named .rsrc seemed

highly likely to contain resources such as dialogs, icons, and menus, but since these binary formats are known to be relatively complex in Windows 3.0, I put the .rsrc section aside for later.

The section name .idata was suggestive of import data and I knew that the

File	Display	Virtual	Raw Data	Size	Attributes
.text	00010000h 00000400h 00000000h 0001C020h 00000020h				
.bss	00000000h 00000000h 00000000h 00000000h 00000000h				
.rdata	00000000h 00000000h 00000000h 00000000h 00000000h				
.data	00000000h 00000000h 00000000h 00000000h 00000000h				
.rsrc	00000000h 00000000h 00000000h 00000000h 00000000h				
.idata	00000000h 00000000h 00000000h 00000000h 00000000h				
.CRT	00000000h 00000000h 00000000h 00000000h 00000000h				
.reloc	00000000h 00000000h 00000000h 00000000h 00000000h				
.debug	00000000h 00000000h 00000000h 00000000h 00000000h				

Figure 4: The EXELook demonstration program in action, showing the file section headers for a Windows NT executable file.

PE file must have an import table in it somewhere, so I decided to take a closer look at this particular section. A quick scan of the section's contents showed a fairly regular pattern of binary data for several hundred bytes followed by a series of ASCII strings including recogniza-

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Figure 5: The EXELOOK demonstration program in action, showing the imported modules and functions for a Windows NT executable file.

ble API function names and DLL names, so my initial guess that this section contained the file's import table was confirmed. Returning to the data at the beginning of the section, I noticed that

beginning of the section, with each entry in the directory occupying five DWORDS (which is 20 bytes) and corresponding to one imported module.

Having gotten this far, we know that

many of the numbers appeared to be pointers based on the virtual address specified for section .idata in its section header. When correcting for this base address, I found that every fifth DWORD, starting with the fourth DWORD from the beginning of the section, pointed to one of the module names. This was evidence for some sort of "directory" located at the be-

the directory of imported modules must somehow also be able to lead us to the function names that are imported from each module. Examining the remaining DWORDs in the first of the directory entries, we find that the first of them also appears to be a pointer in the right ballpark to fall within the virtual address range of the section. Following the pointer, we find yet another pointer that (after correction for the virtual base address) brings us to a function name. Aha! Just a little more work reveals that the intermediate pointer is actually the first of a list of pointers to all the function names for that module, and the list is terminated by a NULL pointer. At this point we have enough information to write a little program called EXELOOK that traverses the file header, optional header, section headers, and .idata section contents to display a list of sections, imported modules, and imported functions on the screen as shown in Figures 4 and 5.

EXELOOK.C

1 of 2

```
// ExeLook - Display Information about NT EXE File
// Copyright (C) 1992 Ray Duncan
// PC Magazine * Ziff Davis Publishing

#define dim(x) (sizeof(x) / sizeof(x[0])) // returns no. of elements

struct decodeUINT { // structure associates
    UINT Code; // UINts with a string
    char * Name;
};

// deduced structure of imported module directory
// found at start of .idata section
typedef struct _IMAGE_IMPORT_MODULE_DIRECTORY {
    UINT ImportList;
    UINT Reserved1;
    UINT Reserved2;
    UINT ModuleName;
    UINT Reserved3;
} IMAGE_IMPORT_MODULE_DIRECTORY, *PIMAGE_IMPORT_MODULE_DIRECTORY;

// typedefs for convenience in referring to image structures
typedef IMAGE_DOS_HEADER * PMZHEADER;
typedef IMAGE_NT_HEADERS * PPEHEADER;
typedef IMAGE_FILE_HEADER * PCOFFHEADER;
typedef IMAGE_OPTIONAL_HEADER * PPOPTHEADER;
typedef IMAGE_SECTION_HEADER * PSCNHEADER;
typedef IMAGE_DATA_DIRECTORY * PDATA DIR;
typedef IMAGE_IMPORT_MODULE_DIRECTORY * PMODULEDIR;
typedef IMAGE_IMPORT_BY_NAME * PIMPORTNAME;

struct decodeUINT SectionChars[] = { // section characteristics
    IMAGE_SCN_TYPE_REGULAR, "Regular",
    IMAGE_SCN_TYPE_DUMMY, "Dummy", // reserved
    IMAGE_SCN_TYPE_NO_LOAD, "Not loaded",
    IMAGE_SCN_TYPE_GROUPED, "16-bit offset code",
    IMAGE_SCN_TYPE_NO_PAD, "Unpadded",
    IMAGE_SCN_TYPE_COPY, "Copy", // reserved
    IMAGE_SCN_CNT_CODE, "Machine code",
    IMAGE_SCN_CNT_INITIALIZED_DATA, "Initialized data",
    IMAGE_SCN_CNT_UNINITIALIZED_DATA, "Uninitialized data",
    IMAGE_SCN_LNK_OTHER, "Other", // reserved
    IMAGE_SCN_LNK_INFO, "Information",
    IMAGE_SCN_LNK_OVERLAY, "Overlay",
    IMAGE_SCN_LNK_REMOVE, "Not part of image",
    IMAGE_SCN_LNK_COMDAT, "COMDAT",
    IMAGE_SCN_MEM_DISCARDABLE, "Discardable",
    IMAGE_SCN_MEM_NOT_CACHED, "Not cacheable",
};
```

```
IMAGE_SCN_MEM_NOT_PAGED, "Not pageable",
IMAGE_SCN_MEM_SHARED, "Shareable",
IMAGE_SCN_MEM_EXECUTE, "Executable",
IMAGE_SCN_MEM_READ, "Readable",
IMAGE_SCN_MEM_WRITE, "Writeable", );

// various #includes and data declarations omitted here

INT hFile = -1; // handle for current file
HANDLE hMap = 0; // handle, file mapping object
PSTR pMap = NULL; // base address, mapping object

PMZHEADER pMZHeader; // pointers to header
PPEHEADER pPEHeader; // structures within mapped
PCOFFHEADER pCoffHeader; // executable file
PPOPTHEADER pOptHeader;
PSCNHEADER pFirstScnHeader;
PSCNHEADER pIdDataHeader;
PDATA DIR pDataDirectory;
PMODULEDIR pIdData;

// Various "generic" routines omitted here

// ShowSections -- formats information about the COFF sections
// in the executable file.
//
VOID ShowSections(VOID)
{
    char temp[256], temp2[256];
    UINT i, j;
    PSCNHEADER pCurScnHeader = pFirstScnHeader;

    AddLine("\t Virtual Raw Data Relocs LineNums");
    AddLine("\t Addr/Size Addr/Size Addr/Cnt Addr/Cnt Attributes");

    for(i = 0; i < pCoffHeader->NumberOfSections; i++)
    {
        wprintf(temp, "%8s %8Xh %8Xh %8Xh %8Xh %8Xh",
            pCurScnHeader->Name,
            pCurScnHeader->VirtualAddress,
            pCurScnHeader->PointerToRawData,
            pCurScnHeader->PointerToRelocations,
            pCurScnHeader->PointerToRelocations,
            pCurScnHeader->PointerToRelocations);
    }
}
```

Figure 6: Extracts of the source code for the EXELOOK program, showing the portions of the program concerned with decoding and displaying the COFF section headers and the import table. The full source code for the program can be downloaded from PC MagNet.

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EXELOOK.C

2 of 2

```

    pCurScnHeader->PointerToLinenumbers,
    pCurScnHeader->Characteristics);
AddLine(temp);

wsprintf(temp, "      %08Xh %08Xh %08Xh %08Xh ",
    pCurScnHeader->Misc.VirtualSize,
    pCurScnHeader->SizeOfRawData,
    pCurScnHeader->NumberOfRelocations,
    pCurScnHeader->NumberOfLinenumbers);
AddLine(temp);

strcpy(temp2, "");

for(j = 0; j < dim(SectionChars); j++)
{
    if(SectionChars[j].Code & pCurScnHeader->Characteristics)
    {
        if(strlen(temp2))
            strcat(temp2, ", ");

        strcat(temp2, SectionChars[j].Name);
    }
}

if(strlen(temp2))
{
    wsprintf(temp, "      %s", temp2);
    AddLine(temp);
}

pCurScnHeader = (PSCNHEADER) ((PBYTE) pCurScnHeader +
    sizeof(IMAGE_SECTION_HEADER));
}

//
// ShowImports - formats names of imported modules and their
// entry points.
//
VOID ShowImports(VOID)
{
    char temp[256];                // formatting buffer
    PMODULEDIR pCurModule = pIdata; // module directory pointer
    PBYTE pModuleName;            // module name pointer
    UINT * pImportList;           // function list pointer
    PIMPORTNAME pImportEntry;     // imported function pointer

    // walk through the imported module directory which is found
    // at the beginning of the file section ".idata"
    while(pCurModule->ModuleName)
    {
        // extract pointer to the imported module's name from
        // the current module directory slot
        pModuleName = (PBYTE) pIdata + pCurModule->ModuleName -
            pIdataHeader->VirtualAddress;

        // copy the module name to local storage (since ".idata" is
        // in read-only memory), then fold it to upper case for display
        strcpy(temp, pModuleName);
        _strupr(temp);
        AddLine(temp);

        // extract a pointer to the list of imported functions for
        // this module from the module directory entry
        pImportList = (UINT *) ((PBYTE) pIdata + pCurModule->
            ImportList
            pIdataHeader->VirtualAddress);

        // walk through the list of pointers to structures for the
        // imported functions until a NULL pointer is encountered
        while(*pImportList)
        {
            // calculate the address of the structure describing this
            // imported function
            pImportEntry = (PIMPORTNAME) ((PBYTE) pIdata + *
                pImportList -
                pIdataHeader->VirtualAddress);

            // format the name of the imported function for display
            wsprintf(temp, "%s", pImportEntry->Name);
            AddLine(temp);

            // go to the next imported function for this module
            pImportList++;
        }

        // calculate the address of the next module directory entry
        pCurModule = (PMODULEDIR) ((PBYTE) pCurModule +
            sizeof(IMAGE_IMPORT_MODULE_DIRECTORY));
    }

    //
    // SetHeaderPtrs -- this routine sets up pointers to various
    // "interesting" header structures within the executable file.
    // It is called after the file is successfully opened and mapped
    // but before any routines are called to decipher and display the
    // structures within the file.
    //
    VOID SetHeaderPtrs(VOID)
    {
        UINT i;
        PSCNHEADER pCurScnHeader;

        // calculate address of DOS real mode (MZ) file header
        pMZHeader = (PMZHEADER) pMap;

        // calculate address of NT protected mode (PE) file header
        pPEHeader = (PPEHEADER) ((PBYTE) pMZHeader + pMZHeader->e_lfanew);

        // calculate address of COFF File Header and Optional Header
        pCoffHeader = (PCOFFHEADER) &pPEHeader->FileHeader;
        pOptHeader = (POPTHEADER) &pPEHeader->OptionalHeader;

        // calculate address of data directory (embedded in Optional Header)
        pDataDirectory = (PDATADIR) &pOptHeader->DataDirectory;

        // calculate address of first section header
        pFirstScnHeader = (PSCNHEADER) ((PBYTE) pOptHeader +
            pCoffHeader->SizeOfOptionalHeader);

        // look through the section headers to find header for file section
        // containing import table (.idata), save address of the header
        // and the file section's raw data for use by ShowImports()
        pCurScnHeader = pFirstScnHeader;
        pIdataHeader = NULL;

        for(i = 0; i < pCoffHeader->NumberOfSections; i++)
        {
            if(!strcmp(pCurScnHeader->Name, ".idata"))
            {
                pIdataHeader = pCurScnHeader;
                pIdata = (PMODULEDIR) (pMap + pIdataHeader->
                    PointerToRawData);
                break;
            }
            pCurScnHeader = (PSCNHEADER) ((PBYTE) pCurScnHeader +
                sizeof(IMAGE_SECTION_HEADER));
        }
    }
}

```

Extracts of the source code for EXELOOK related to decoding and displaying section headers and the import table can be found in Figure 6. As always, the full source code and executable file for the program can be downloaded from the Programming Forum on PC MagNet archived as EXELOO.ZIP. In the next installment of this column, we'll probe into the resource and export tables in the Windows NT PE file format and expand the EXELOOK program to deal with them.

FURTHER READING

- *Understanding and Using COFF*, by Tim O'Reilly, \$29.95. Published by O'Reilly and Associates Inc., Sebastopol, CA. ISBN: 0-937175-31-5; 176 pages.
- RESFMT.ZIP, documentation of the binary format of WIN32 resources. Includes dialog templates, menu templates, cursor, bitmaps, fonts, and stringtables. This file can be downloaded from Library 4 of the MSWIN32 Forum on CompuServe.
- NTIMAGE.H, a header file for C-

language programs that documents many (but not all) of the elements of a Windows NT executable file. The file can be found in the MSTOOLS\H\ directory of the Windows NT Software Development Kit.

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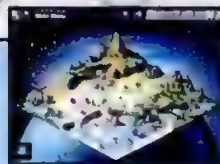


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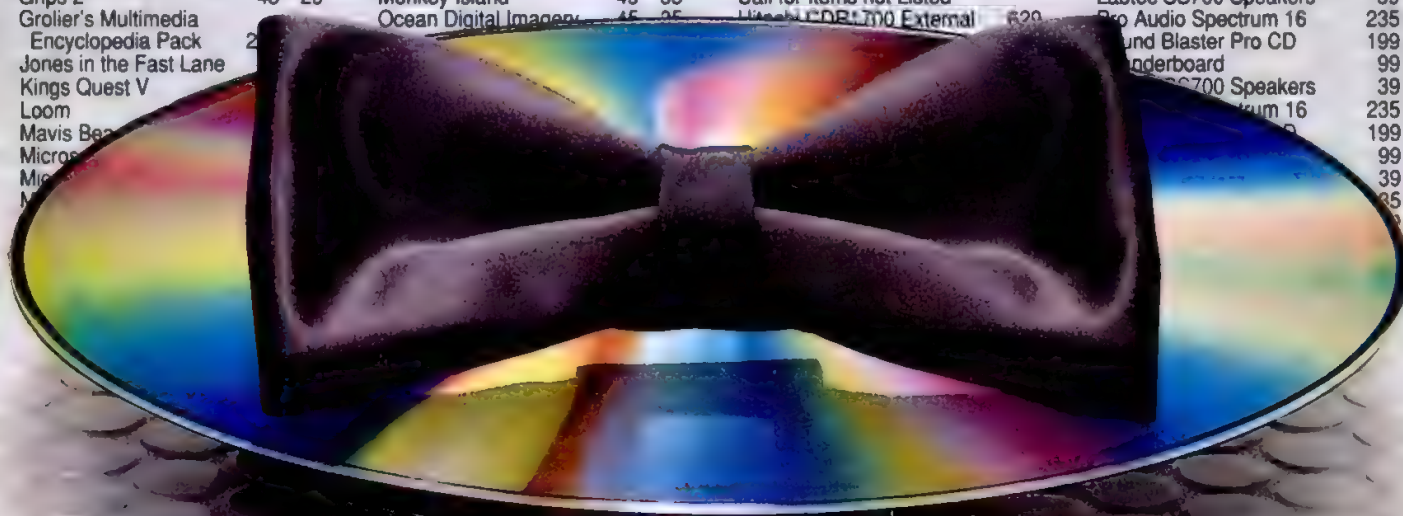
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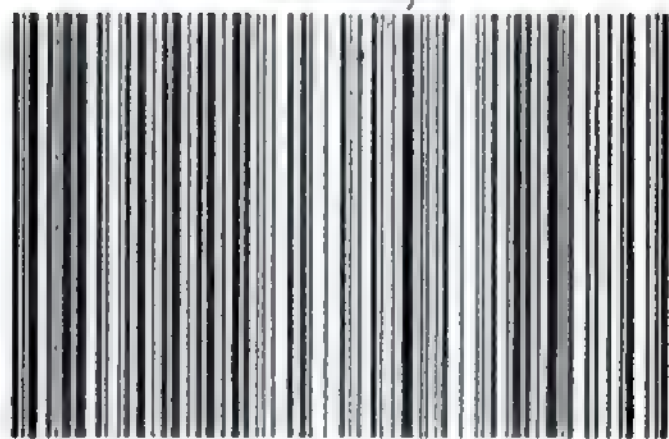
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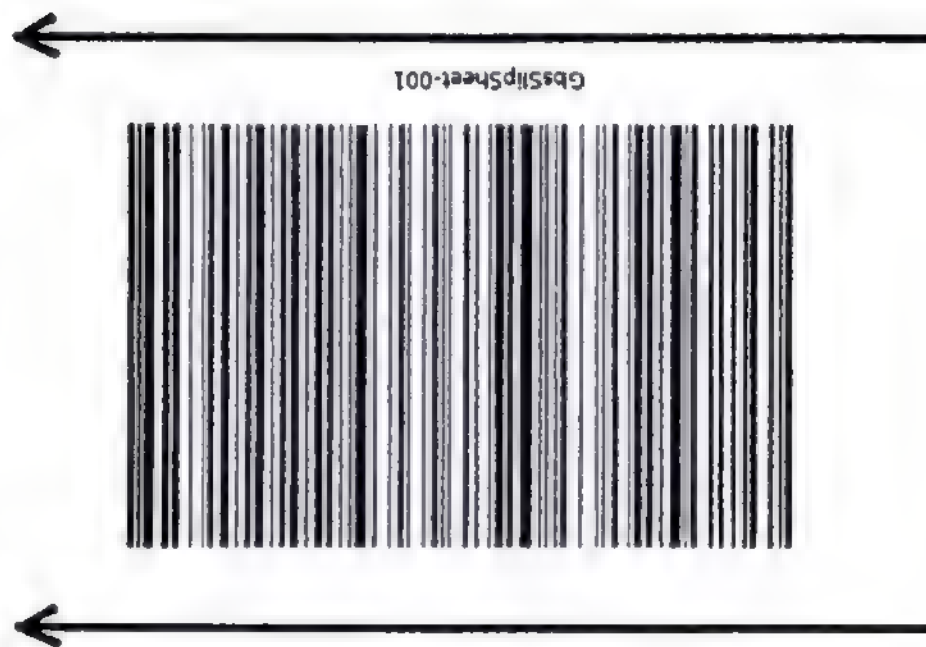
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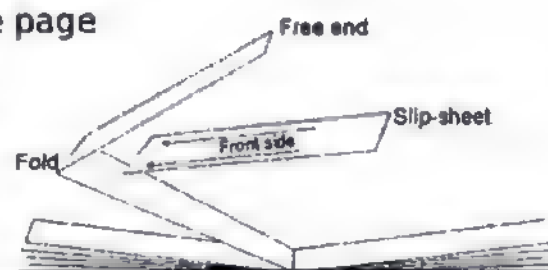
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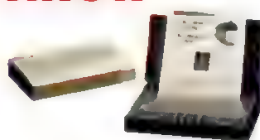
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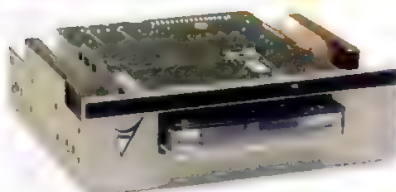
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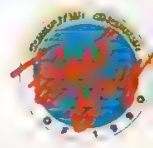
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Operating Environments

UNDOCUMENTED WINDOWS FILES

I recently upgraded my system to Windows 3.1, and I've been exploring the new features Microsoft included in the package. After running the setup program, I noticed some undocumented files that were not included in a program group. One of these files is SYSEDIT.EXE, which Windows places in the SYSTEM directory. I found SYSEDIT to be a great tool for editing my configuration files from within Windows.

Another file I discovered is called DRWATSON.EXE, located in the WINDOWS directory. If I run this program, an icon of a doctor pops up, which, when I click on it, gives me the message that there are "NO SYSTEM FAULTS." I

assume this is a tool for monitoring system activity. I also found a file called MSD.EXE (Microsoft Diagnostics). I think this file is for users to run before calling Microsoft tech support.

I have two questions. Do you know if Dr. Watson can be used for any other useful functions? And are there any other undocumented files Microsoft doesn't tell us about that could be of use?

Greg Zimmerman
Phoenix, Arizona

PC MAGAZINE: SYSEDIT.EXE, included in both Windows 3.0 and 3.1, makes it easy for you to edit the four essential configuration files, WIN.INI, SYSTEM.INI, AUTOEXEC.BAT, and CONFIG.SYS. When you start SYSEDIT, it loads each file in a separate editor window. You can search and edit these files, making any necessary changes. Changes to the .INI files won't take effect until you restart Windows. Activating changes to the other two files requires that you reboot the system.

Any time you change one of the four configuration files, SYSEDIT keeps the

Our Advisors

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original file as a backup, changing its extension to .SYD. For example, if you edit AUTOEXEC.BAT, the original file will be retained as AUTOEXEC.SYD. Note that SYSEDIT effectively removes the read-only attribute from the files it edits. To be precise, the .SYD backup file retains the read-only attribute and the modified version of the file is *not* read-

only. It's not a good idea to make the two .INI files read-only, but if you edit a read-only AUTOEXEC.BAT or CONFIG.SYS file with SYSEDIT, you'll have to use File Manager or the ATTRIB command to restore that attribute.

Dr. Watson monitors the "health" of your Windows system. If an Unrecoverable Application Error or General Protection Fault occurs, Dr. Watson records detailed information about the problem in the file DRWATSON.LOG. It also prompts you to note precisely what was happening at the time the error occurred. The log file probably won't be of interest to you, but you can use it when calling the tech support line for the program that caused the problem. Dr. Watson lets you choose to close the problem program or ignore the error. If you choose to ignore, save your work (if possible) and exit the offending program right away.

In your particular case, no UAEs or General Protection Faults had occurred, so Dr. Watson had nothing to report. If you're interested in adding Dr. Watson's protection to your system, put DRWATSON.EXE in your Startup group, or add it to the LOAD= line in WIN.INI.

MSD.EXE is another utility whose output is more useful to a tech support department than it is to you. It produces an exhaustive report on your system's components and capacities. The report includes the amount and type of memory

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available, along with the TSRs and drivers loaded in that memory. It reports on the video adapter (MSD recognizes over 200 adapters by name), the mouse, serial and parallel ports, and disk drives. A list of IRQ (interrupt request) lines can help you configure a new peripheral adapter board for an unused IRQ line. MSD even extracts copyright notices, help messages, and other strings of text from system ROM. To wrap up the report, it appends copies of AUTOEXEC.BAT, CONFIG.SYS, WIN.INI, and SYSTEM.INI.

MSD is a DOS application, not a WinApp. If you run it under Windows, you'll get a warning that its reports are more reliable when run under DOS. Try running MSD and printing its report to a file—that file will come in handy if you have to call on tech support for help.

Finally, you asked whether any other mysterious files are installed with Windows. I analyzed the SETUP.INF file that tells SETUP how to operate, looking for programs installed by SETUP but not loaded into a Program Manager group. There were seven such applications, the three you found plus DSWAP.EXE, WSWAP.EXE, TASKMAN.EXE, and EXPAND.EXE. The first two are support files for task swapping in standard mode, and should never be executed by the user. TASKMAN doesn't need to reside in a ProgMan group because you can invoke it by pressing Ctrl-Esc or double-clicking on the desktop, and EXPAND is used by SETUP. In other words, you found the three most important applications! MSD reports on your system configuration, SYSEDIT lets you change the configuration, and DRWATSON watches over your system and attempts to protect it from major problems.

—Neil J. Rubenking

TURNING AUTOSAVE OFF

TIP After I had replaced PROGMAN.EXE with NDW.EXE as the Windows 3.1 shell, I ran into some trouble. When I first installed Windows, I configured it to have my setup saved each time I left Windows. But after I installed Norton Desktop 2.0, I decided I would rather save time, so I wanted to turn the AutoSave function off. To my frustration, there was no menu item that would allow me to do this.

To turn AutoSave off, I began by changing the WIN.INI file's [Second Conflict] section, replacing AutoSave=On with AutoSave=Off, but this seemed to have no effect. Even more puzzling, when I replaced NDW.EXE with PROGMAN.EXE as the Windows shell, the menu indicator for AutoSave was unchecked, but Windows *still* saved the configuration on exit. I found the answer in the NDW.INI file's [Quick Access] section, where Norton apparently looks for its AutoSave directions. Once I changed AutoSave=1 to AutoSave=0, the function was finally disabled.

Christopher J. Waraksa
Milwaukee, Wisconsin

► **PC MAGAZINE:** As you discovered, Norton Desktop's configuration information is stored in the file NDW.INI, *not* in WIN.INI. In general, modern Windows applications use private .INI files rather than shoveling new lines into the already-overloaded WIN.INI. Just for your information, the [Second Conflict] section you found in WIN.INI was put there by a Windows-based game named Second Conflict that involves intergalactic empire building.

There are actually two lines in NDW.INI that control configuration sav-

ing. In the [Configuration] section, setting SAVE=FALSE causes NDW itself to not save configuration on exit. Omitting the SAVE= line or setting SAVE=TRUE tells NDW to save its configuration on exit. This option can be controlled from the Configuration menu, under Preferences. If you don't see Preferences on that menu, choose Load Full Menu and look again.

As you say, automatic saving of Quick Access configuration is controlled by the AutoSave= line in the [Quick Access] section of NDW.INI. AutoSave=0 specifies that the Quick Access configuration will not be saved automatically on exit. No AutoSave line or AutoSave=1 means the configuration will be saved.

—Neil J. Rubenking

HOW TO CONTACT US

Do you have a hardware, software, or systems problem you can't solve? Do you have a tip you think other readers could use? Or maybe you'd like a better understanding of how something works. If so, we invite you to let us know about it. Our experts can give you practical solutions to your problems, provide techniques for using your software and hardware more productively, and help you grasp computer concepts and understand the latest technology.

It's easy to contact us. Just send us your submission (use ASCII format for text files) via the medium that's most convenient for you:

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TRACKING INSTALLATION PROGRAMS

TIP Is there a utility out there that can report precisely on the effects of a software installation? By this I mean providing a list of all the new files and directories, and all files modified by the installation. Under Windows, knowing which .INI files have been modified would be invaluable for diagnostic pur-

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CIRCLE 045 ON READER SERVICE CARD

poses, or for removing the program entirely.

Meanwhile, here's a simple method using DOS 5.0 commands:

- Make a complete backup of the drive or use the DOS 5.0 ATTRIB command to clear the archive bit for all files on the drive. From the root directory of the drive, use the command ATTRIB -A /S. This mimics the archive-bit clearing done by a complete backup.
- Install your new software.
- Use the command DIR /A:A /S > NEW from the root directory of the drive to determine which files are either new or modified by the install. This will create a complete listing of the new or modified files, redirected to a file named NEW, which you can browse using EDIT, NOTEPAD, or the word processor of your choice.

To add another level of utility, you could also run DIR /S > OLD beforehand. This gives you the size of the original files for purposes of comparison. Just open the file OLD and search for the filename you're curious about.

Note that the third step can also tell you how large an incremental backup would be, in less time than it would take to load your backup program. Just check the second-to-last line in the listing, which will be the total size for all files in the DIR listing.

David Archer
Vancouver, British Columbia
Canada

► **PC MAGAZINE:** There is a utility for managing installation of Windows programs—my own INCTRL program (*PC Magazine*, July 1992). Version 1.01 is available on PC MagNet.

INCTRL automates the process described here and checks for changes to individual lines of WIN.INI and SYSTEM.INI. It also distinguishes between new files and changed files. But you can get a lot of the functionality of INCTRL using the method described here. This technique works for tracking the installation of DOS-based programs as well.

The key to this approach is the *archive bit* or archive attribute. When you create or modify a file, DOS sets the archive bit in that file's directory entry. Most backup programs clear the archive bit after backing up the file. The bit is normally used

to determine which files have been created or changed since the last backup.

DOS's ATTRIB command lets you take direct control of the file attributes. DOS 3.3 added the /S switch to ATTRIB, which extends the effect of the command into all subdirectories of the current directory. Running ATTRIB -A /S from the root directory will clear the archive bit for all files on that drive. You can also specify the starting drive and directory, for example, ATTRIB D:*.* -A /S.

Any install program you run will add some new files and possibly change others. All files added or changed will have their archive bit set. In DOS 5.0, the DIR command's /A switch lets you specify files with a particular attribute, and the /S switch causes DIR to extend its reporting to all directories below the specified directory. Hence DIR /A:A /S executed from the root directory of a drive will list all files on that drive whose archive bit is set. By redirecting the output of this command to a file, you make it available for later use.

The new switches for the DIR command make DOS 5.0 the preferred version for this technique, but you can still make it work with Version 3.3 or later. Instead of creating the final report using DIR, execute the command

```
ATTRIB /S | FIND "A" > NEW
```

from the drive's root directory. This will create a list of all files on that drive whose archive bit is set. The format will be different from that of the DOS 5.0 DIR command; it will include just the path-name of the file, without any information as to size or date.—Neil J. Rubenking

Word Processing

INCREMENTING INVOICE NUMBERS IN WORDPERFECT

✓ **TIP** If you create invoices in WordPerfect 5.1, keeping track of the number you're up to can be a problem. Here's a technique that will automatically enter and increment the number with each new invoice.

Start by creating an invoice document

that includes a table. You can then define the invoice number as a formula in a table cell. The formula should increment the invoice number by one each time it's calculated. If the cell containing the invoice number is D1, for example, the formula is: D1+1.

Next, create the macro shown in Figure 1. The macro assumes that when you start it, you are working with either an empty document or one that you don't want to save. Even so, it starts by warning you to press F1 to cancel the macro if you haven't saved your current document, or press Enter to continue.

If you press Enter, the macro clears the current document, retrieves the invoice form, recalculates the table to increment the invoice number by one, saves the invoice, and leaves you with a blank invoice on-screen. You can then fill in the line items in the invoice, print it, and save a copy to disk.

Lee Wee-Meng
Singapore

► **PC MAGAZINE:** For people who create invoices in WordPerfect, this is a useful approach indeed. However, the description as given assumes a great deal of knowledge about tables. WordPerfect models its tables on spreadsheets, with columns designated by letters, rows by numbers, and individual cells by their column letter and row number.

Note that you are not limited to a standard invoice form such as the one in Figure 2. If you prefer a free-form invoice, you can still use this technique. The number is the only item that must be in a table, and you can limit the table to a single row and column. Similarly, you can create a table with or without lines defining the cells. In Figure 2, for example, the word *Number* is in a different cell from the actual invoice number, even though there is no line between the two cells.

To create a table as part of your invoice document, choose Alt-F7, Tables, Create, then respond to the appropriate prompts, giving the number of columns and rows you want. WordPerfect will create the table and take you to its tables menu. A full discussion of the menu is well beyond the scope of this tip, but note that the first-level menu includes several choices that you will want to experiment with in order to see how they let you con-

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INV1.WPM
Complete Listing

```
{:})This WordPerfect 5.1 macro will load an invoice form and automatically
increment the invoice numbers as you enter new ones~
{LABEL}Start~
{CHAR}Continue~
Press F1 if you have not saved your file or press Enter to continue~
{IF}*{VARIABLE}Continue~"!={Enter}*~
{GO}Start~
{END IF}
{DISPLAY OFF}{Exit}nn
{Retrieve}invoice{Enter}
{Columns/Tables}temc{Exit}
{Save}invoice{Enter}y
```



Figure 1: This macro loads an invoice form and increments the invoice number. Note that in the first part of the macro, if you want to press any key rather than Enter to continue, you can eliminate the first line and the entire (IF)...(END IF) construction.

trol the table format.

Once you're satisfied with the format for the table, use the arrow keys to move to the cell where you want the invoice number. Then, from the tables menu, choose Math, Formula. If you want to start your invoices from number 1, you can simply enter the formula as already described. If the cell is in the fourth column and first row (as shown in Figure 2, for example), it is D1, so you can type:

D1+1<enter>

Most often, however, you will not want to start with invoice number 1, but will want to continue with a numbering system you already use, or start with some arbitrary number such as 1,001. To start at any given number, enter the number you want to start with, minus 2. To start at 1,001, for example, type

999<enter>

as the original number. (This will show as 999.00, but ignore the zeros for now.) Next, choose Math, Formula again, and type the appropriate formula, such as

D1+1<enter>

WordPerfect will enter the formula and calculate the answer: 1,000. You can then save the file to disk. The first time you run the invoice macro, it will recalculate, so that your first invoice number will be 1,001.

All that remains for the invoice number is to eliminate the decimal places. With the tables menu showing, move to

the cell with the invoice number, choose Format, Column, Digits, enter 0 for the number of decimal places, and hit Enter. The invoice number will still show with two decimal places, but the decimal marker and decimal places will disappear the next time you recalculate.

If you like, you can reenter the number, and then the formula to see the result without the decimal places. Alternatively, you can return to the normal editing screen and enter a number without decimal places directly into the cell. When you enter a number from the normal editing screen, you replace the value of the cell, not the formula. This stands in contrast to what happens when working in the Tables Editing screen, where you can enter a number only as a formula that replaces any formula already in the cell.

There is one additional step you might like to take if you use the standard invoice format as shown in Figure 2. Because this format is fully defined with a table, you can take further advantage of the table's math features to create a mini-spreadsheet that will calculate the amount for each line item and the total for the invoice.

Notice that in Figure 2, the invoice number is over the Quantity column, which frees you to set the Amount column to two decimal places while setting the column that holds the invoice number and quantity to zero decimal places.

In order to enter the formulas for the amounts, simply

move to the first cell under Amount, and enter a formula for multiplying the price per item times quantity. For example, since the first line under Amount in Figure 2 is line 3, the formula in E3 would be: C3*D3.

You can then choose Math, Copy Formula, Down, then enter the number of times to copy it, to fill in the cells for each line item. To enter a subtotal, choose Math, + (the plus sign), which will add the numbers directly above the subtotal function. To enter the tax, create a cell (C8 in Figure 2), to enter the tax rate, then enter the formula just below the subtotal to multiply the tax rate by the subtotal. In Figure 2, it's: C8*E7/100. For the total, enter a formula to add the subtotal plus the tax (cells E7+E8.)

If you take this route, you'll need a slightly different macro for retrieving the invoice form. If you use the original macro, each invoice will increment by two rather than one, because you'll have to give the Calculate command (with Alt-F7, Math, Calculate) after entering the line items. And even if you don't use the invoice to calculate totals, the macro in Figure 1 leaves you in danger of accidentally overwriting the original INVOICE file with a modified version.

The macro in Figure 3 solves both problems. It first increments the invoice number and saves the incremented version to INVOICE, then saves the file to INVOICE.TMP, so that if you accidentally save the file without giving it a new name, you will not overwrite the original INVOICE. (This is yet another way to prevent accidental overwriting of a file, a subject we also covered in the February



Figure 2: This standard invoice form, when used with the macro in Figure 1, will let you calculate totals and increment the invoice number at the same time.



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INV2.WPM

Complete Listing

```
{LABEL}Start ~
{CHAR}Continue ~ Press-F1-if-your-file-is-not-saved-or-Enter-to-continue ~
{IF}*{VARIABLE}Continue ~"!="{Enter}" ~
{GO}Start ~
{END IF}
{DISPLAY OFF}{Exit}nn
{Retrieve}invoice{Enter}      (;)Load-INVOICE-and-update-Inv-No ~
{Columns/Tables}temc{Exit}
{Save}invoice{Enter}y        (;)Save-INVOICE-and-save as INVOICE.TMP ~
{Save}invoice.tmp{Enter}y
{Tab}{Tab}{Block}{Word Right} (;)Move-to-and-block-invoice-number ~
{Macro Commands}A1{Enter}    (;)Assign-formula-result-to-variable-1 ~
{Left Mar Rel}{Left Mar Rel} (;)Move-back-to-cell-with-Inv-Number ~
{Columns/Tables}{Backspace}mf (;)Enter-Inv-Number-as-new-formula ~
{VAR 1}{Enter}{Exit}
{Left Mar Rel}{Left Mar Rel} (;)Backtab-to-first-cell ~
```



Figure 3: This macro is similar to the one in Figure 1 in that it loads an invoice form and lets you automatically increment the invoice number. However, this version assumes that you will be using the invoice form to calculate totals and increment the invoice number at the same time. Here again, you can change the first part of the macro to let you press any key. Simply eliminate the {LABEL} command and the entire {IF}...(END IF) construction.

11 and September 15, 1992, issues.)

Next the macro converts the invoice number from a formula result to a number by blocking the result, reading it into a variable, going to the Tables Edit screen, and entering the result as a new formula. Finally, it moves the cursor to the first cell of the table, where you will need to enter the customer name and address. You can now recalculate as many times as you like without changing the invoice number.

Note that the macro assumes that INVOICE.TMP already exists when it answers Y after the save command. Be sure to create a file by that name before you run the macro the first time. Finally, note that you'll want to add the drive and path-name in front of the INVOICE and INVOICE.TMP filenames to ensure that the macro will work no matter what directory you happen to be working in at the moment. (You can download both INV1 and INV2 from PC MagNet archived as INV.ZIP.)

a column is just slightly too narrow to display a number in General format, you can sometimes make the number visible just by switching to Fixed format with no decimal places.

For example, try displaying 1234 in a five-character-wide column, using General format and WYSIWYG's 14-point Swiss font. You get asterisks. Switch to Fixed format with no decimal places, and you get 1234.

I thought this tidbit might be useful to others who, like me, sometimes need to stuff the maximum number of characters into narrow columns.

Charles Prokes
Kelowna, British Columbia
Canada

► **PC MAGAZINE:** I couldn't find anyone at Lotus who could explain why WYSIWYG would regard an integer in Fixed,0 format as being narrower than the same integer in General format. But Mr. Prokes is correct. Changing from General to Fixed sometimes lets you squeeze an extra character into a narrow column. Store this one in your WYSIWYG trivia file; you never know when it may come in handy.—Craig Stinson

EXCEL CHART TEMPLATES

❓ The item in your November 10, 1992, Spreadsheets column about using styles to achieve consistent formatting in Excel

set me to thinking. I often create highly customized charts, and many times I find myself going through the same steps again and again with different data, just to create a set of charts that look more or less alike.

For example, the chart shown in Figure 4 maps the "TED spread" (the price differential between T-bill and Eurodollar futures) for the December 1992 futures contract. The green and blue lines plot T-bill and Eurodollar prices, respectively, and the gray dotted hi-lo lines show the relationship of the two prices at each point along the plot. The thick red line, plotted against a secondary y-axis, plots the spread.

I've applied manual scaling to both y-axes, added and positioned a legend, and created a chart title. I've also applied a small font (8-point Arial Narrow) to all the text except for the main title, removed the tick lines from the x-axis, and used the Scale command to suppress every other x-axis tick label. All this took a bit of time and effort.

The graph does a good job of showing that during times when T-bills and Eurodollars are falling in price, the spread between the two tends to increase. I'm happy with the chart. What I'm unhappy about is having to go through all the customizing steps again (about 19 separate formatting steps—assuming I don't make any mistakes), each time I want to plot a new contract month. There must be a better way!

I was hoping that Excel would provide some equivalent of the Styles command for customizing charts, but I can't find any such feature. I also tried to use group editing to make the same customizing changes to a whole set of graphs at once. But the Group Edit command is not available in chart windows! What's the solution here?

Gregory F. Murphy
Montclair, New Jersey

► **PC MAGAZINE:** The solution is to use Excel's template feature. Create the graph using any set of data (your December numbers will do fine), and then use the Save As command. In the Type list at the bottom-left corner of the Save As dialog box, choose Template. In the File Name box, supply a generic name for this type of chart—such as TEDSPRED. Excel

Spreadsheets

WYSIWYG CHARACTER-FITTING TRICK

✓ **TIP** I recently discovered something peculiar about column widths in the Lotus WYSIWYG program. I found that if

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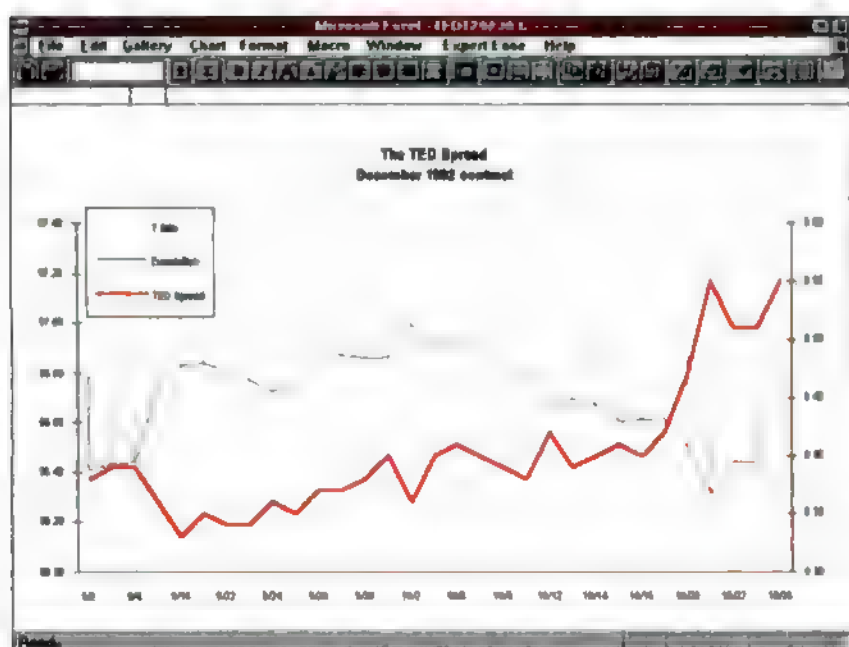


Figure 4: This Excel chart plots the "TED spread"—the price differential between T-bill and Eurodollar futures.

will save your chart and give it the extension XLT, instead of XLC.

Next, use the Save As command a second time. This time, supply a name appropriate for the contract month you're plotting (for example, TED1292) and save the file in Normal format. Excel will append the customary XLC extension to your filename. At this point you have one model file (the XLT) and one expression of that model (the XLC). You can reuse the model now with as many different sets of data as you please.

To create a new graph using the template, start by selecting the data you want to plot. Then use the File Open command and choose the template file. Excel will open the template, plug in your selected data, and display a generic name—such as TEDSPRED1—in the new chart window's title bar. Use the Save As command, give the new chart a particular name, and you're in business.

If you save your template file in a directory named XLSTART, located directly subordinate to the directory containing your Excel program files, Excel will include the template's name in the list that appears when you choose the File New command. That way you can select the data you want to plot, choose File New, and just double-click the name of your template.

You can also open the template file before you select the data you want to plot. In that case, Excel will display the template as an empty chart window. To create the chart, select your data, choose Edit Copy, activate the chart window, and choose Edit Paste.

You're quite right that the Group Edit

command is unavailable for charts. This is unfortunate, because even when you use templates to create a consistent look, there will undoubtedly be times when you'll want to make the same formatting change to a group of charts at once. You might, for example, want to change the end points of your axis scales on all graphs of a particular type. Unless you want to write a macro to do this, you'll still have to make these changes "by hand."

—Craig Stinson

DISGUISED IDENTICAL FIELD NAMES IN 1-2-3

I recently switched from Lotus 1-2-3, Release 2.3, to 1-2-3, Release 3.1+, and discovered that some of my .WK1 files don't work correctly when imported into Release 3. I'm enclosing a worksheet containing a large database and a set of @DSUM formulas. These formulas work correctly in Release 2.3. When I open the sheet in Release 3.1, however, the @DSUM formulas return ERR.

I have called Lotus, but they were unable to help. Can you tell me why my formulas no longer work?

Dan Zenczak

Charlotte, North Carolina

► **PC MAGAZINE:** Your @DSUM formulas return ERR in 1-2-3, Release 3.1, because some of your database fields have identical names. If you fix the field names to make them all unique, the formulas will work fine again. Be aware when you do this that 1-2-3 regards only the cell immediately above a field of data as the field heading. Two-line headings such as these:

```
$ INV
PRODUCTION

BTP COST
PRODUCTION
```

may look unique to you, but they're identical as far as 1-2-3 is concerned.

Earlier versions of 1-2-3 were considerably more permissive than Release 3.x in this particular matter. But the truth is

that you were living dangerously in your .WK1 files. Release 3 is actually doing you a favor by returning ERR.

—Craig Stinson

Databases

TABLE AND FAMILY INFO

✓ **TIP** I enjoyed the Paradox Dictionary of Tables script (DD.SC) presented in the March 17, 1992, Databases column. I use a similar type of script in my Paradox development work—FAMILY.SC. This script (Figure 5) prints the structure of all the Paradox tables in the current directory along with a listing of all family members (forms, reports, validity checks, and so on). For forms and reports, the description is printed along with the form and report number.

I've designed the script so that it prints directly to the printer and does not require any tables or reports of its own. FAMILY.SC begins by creating a list of tables in the current directory. It will ignore any of Paradox's temporary tables, such as ANSWER, LIST, and KEY-VIOL. For each table listed, the script gets the structure and prints each field name and its type. After the structure, the script prints the family listing of the table. A table's family includes the table itself (.DB), image settings (.SET), validity checks (.VAL), primary and secondary indexes (.PX, .X??, .Y??), forms (.F?), and reports (.R?). The script finds the description for each form and report and then prints that along with the name and number.

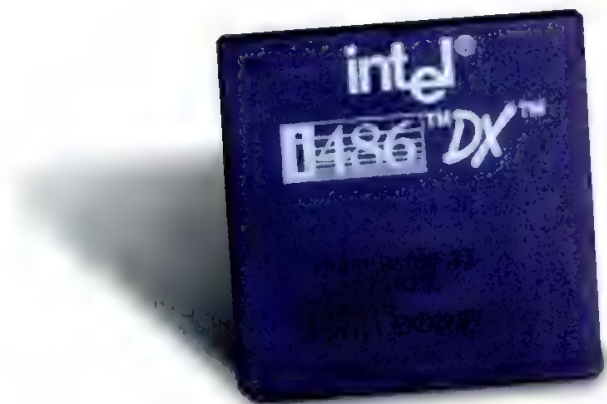
I find it easier to remember a form or report's descriptive name than its number. The FAMILY listing provides an easy way to find out the correct number for use in my application scripts.

Ken Johnson

Oak Park, Illinois

► **PC MAGAZINE:** This script can come in handy whenever you want to document the tables that are used in your PAL applications. A sample of the printout produced by the FAMILY script is shown in Figure 6. The main advantage of this script is that it provides information about the objects that are related to a table (the "family" members) in addition

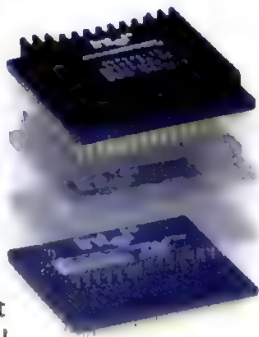
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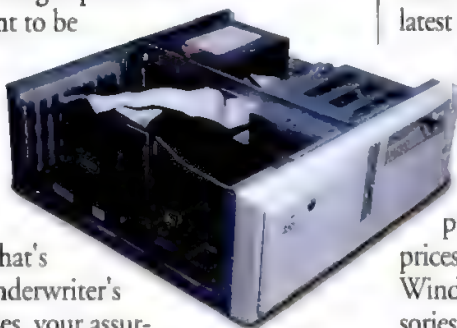
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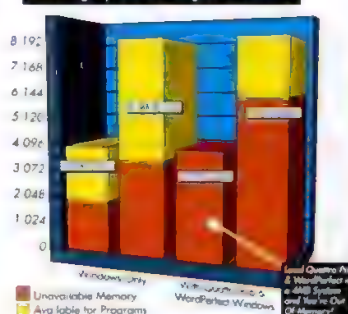
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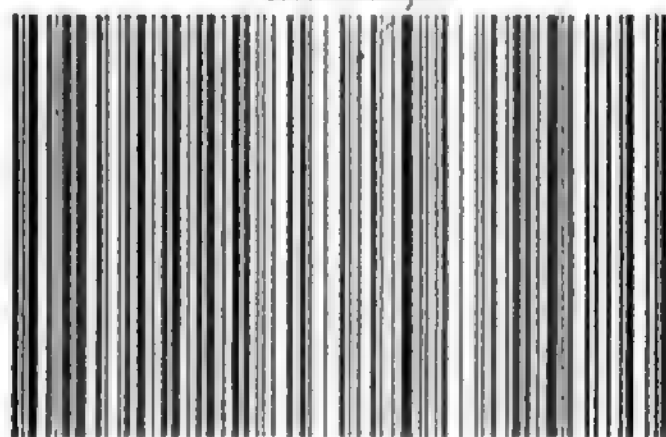
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1. Follow instructions on the other side

Back

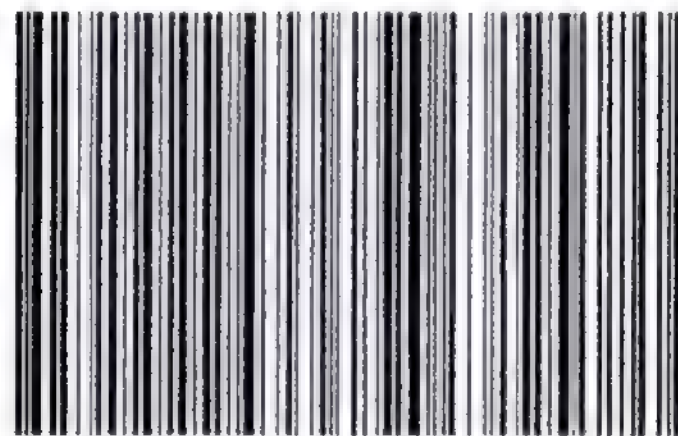
0018-back-0018



Inverted Back

1. Follow instructions on the other side

Folded edge of the page



Inverted Foldout slip-sheet

Foldout slip-sheet

1. Open the foldout page

2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



1. Open the foldout page

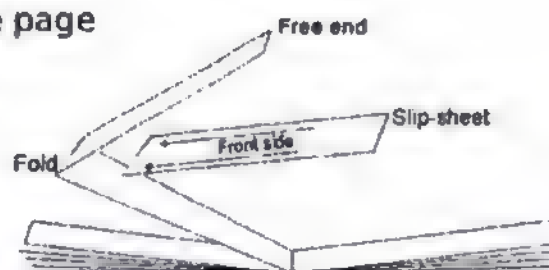
2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



FastMicro 486/Pro Video Power!

Dual VESA Standard!

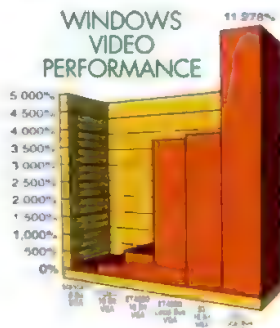
Settle for everything! While a few computer companies give you VESA local bus and even fewer give you a VESA standard monitor, FastMicro includes both!



VESA Standard Local Bus!

Why settle for slow video performance? FastMicro includes a high performance Windows accelerator combined with a VESA standard local bus!

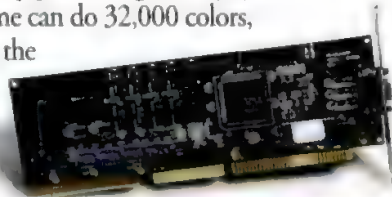
Why is Local Bus faster? The i486DX is a high speed (33+ MHz) 32 bit processor. Video cards plug into a slot in your PC, called a bus connector. The standard PC bus was designed for an 8 MHz 286, therefore it's confined to 8 MHz and 16 bit. FastMicro's VESA Local Bus runs at 33MHz and 32 bit. Turn on your 486/Pro and watch Windows scream!



Why VESA? VESA Local Bus is a standard, unlike a proprietary local bus. You can upgrade your system in the future with third party VESA standard local bus peripherals. With your 486/Pro from FastMicro, you're not locked in.

Plus True Color Video!

No video card delivers more! FastMicro gives you the maximum number of colors possible for scanning, graphics, presentations and desktop publishing. Many systems can only do 256 colors, some can do 32,000 colors, FastMicro takes you to the limit with 16.7 million colors maximum! Plus FastMicro has all the latest VESA video options.



FastMicro Combines VESA Local Bus Performance with Windows Acceleration & over 16 Million Colors!

VESA Standard Flicker-Free Monitor!

Non-Interlaced monitors are not created equal. A non-interlaced monitor with less than a VESA standard refresh rate will flicker at high resolution modes! The resolution is the number of pixels (or 'dots') on the screen, the refresh rate is the speed in which the monitor redraws the screen. Don't be fooled.



VESA Standard Refresh Rates at 640x480, 800x600, & 1024x768!

Your new 486/Pro system from FastMicro includes VESA standard refresh rates at 640x480, 800x600, and 1024x768! Compare and don't settle for less, if other systems don't say it, they won't do it!

20% Larger Display with Edge-to-Edge Video!

In addition to eliminating annoying flicker when running in high resolution modes, FastMicro doesn't make you look at tiny characters either! Our new VESA standard display includes Edge-To-Edge video! 14" monitors are not created equal. You see, 14" is strictly the tube size, not the display area. FastMicro 486/Pro monitors are user adjustable for width, height, and position - just set to your preference and forget it.



Standard Non-Interlaced Monitors



FastMicro Edge-To-Edge Video!

You get more useable screen area than many 15" monitors. Edge-To-Edge video is really a lifesaver when running at 800x600 or 1024x768 Super VGA modes!



Inside the New Fast/Micro 486/Pro!

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WordPerfect is the #1 selling word processing software and the Windows version is loaded with features. It includes the ability to create & edit tables, equations, lists and graphics. You can even edit graphics created

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The latest version of the top selling utility software! PC Tools 8.0 adds an all new DOS desktop with integrated application menu & manager, file viewer & manager, scheduler, and desk accessories. You also get Central Point's award-winning backup and a hot new version of Anti-Virus. PC Tools also includes DiskFix, FileFix, Undelete, Unformat, Disk Edit, Defragmenter, Cache and more! Central Point Commute lets you remotely run Windows or DOS applications and you get new RamBoost Memory Optimizer too!



Quattro Pro for Windows

"Quattro Pro for Windows is worth the wait" proclaims PC Magazine. QPW uses spreadsheet notebooks to easily organize your spreadsheets. Click your right mouse button and Object Inspectors lets you change attributes instantly! Speedbars give you those one-click shortcuts that change depending on what you're working on! Interface Builder lets you build applications without programming. "QPW comes with a separate Database Desktop application - a beautifully designed query-by-example tool" says PC Magazine, "QPW's graphs are gorgeous and include rotatable 3-D types as well as options to adorn them." Need we add more?



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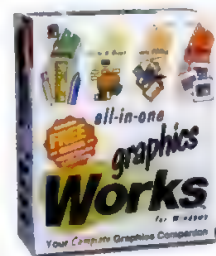
develop custom applications. Paradox also has automatic multiuser support and is network ready. Combine this with the full suite of development tools and SQL connectivity and Paradox is the database of choice!



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Why settle for less? FastMicro includes the real thing: a Microsoft Mouse.



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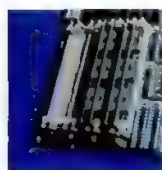


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FastMicro also includes four full megabytes of high-speed SIMM



memory! You can even expand the memory to a total of 32MB. Of course, how can you also expect to get a hard drive at this price? Well, FastMicro includes a quality Conner hard drive with an unbelievable 85MB capacity. Plus, since it's a standard IDE drive, you can easily add a second hard drive later.



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The best part of this system is that you get legendary FastMicro upgradability too! Besides upgrading the



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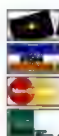
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FAMILY.SC

Complete Listing

```

;-----
; FAMILY.SC - Prints the structure of all Paradox data bases
; (*.db) in the current directory, along with listing of family
; members. For Forms and Tables, the description is printed along
; with the form/report number.
;-----
CLEARALL
printok = PRINTERSTATUS()           ;make sure printer is on
If printok THEN                     ;printer is on, so go
  STYLE REVERSE                     ;put message on screen
  @24,0
  ?? FORMAT("W88,ac","Printing Table Documentation")
  (Tools) {Info} {Inventory} {Tables} {} ;get List of tables
  EDIT "list"
  OPEN PRINTER
  cur_rec = 1
  While cur_rec <= NRECORDS("list") ;cycle through list of tables
    MOVETO RECORD cur_rec          ; but don't include the Pdoc
    If [Name] = "Answer"           ; temporary tables
      OR [Name] = "Struct"
      OR [Name] = "List"
      OR [Name] = "Family"
      OR [Name] = "Keyviol"
      OR [Name] = "Inserted"
      OR [Name] = "Changed"
      OR [Name] = "Crosstab"
      OR [Name] = "Deleted"
      OR [Name] = "Entry"
    THEN
      cur_rec = cur_rec + 1
      Loop
    EndIf
    cur_name = [Name]
    DO_IT!
    MENU (Tools) {Info} {Structure} ;get structure of each table
    SELECT cur_name                 ; and start printing
    PRINT " \n\r"
    PRINT " " + cur_name + " Table\n\r"
    PRINT " \n\r"
    PRINT "      Field Name          Field Type\n\r"
    PRINT "      -----\n\r"
    field_nbr = 1
    While field_nbr <= NRECORDS("struct")
      MOVETO RECORD field_nbr
      PRINT " " + [Field Name] +
        SPACES(27-LEN([Field Name])) + [Field Type] + " \n\r"
      field_nbr = field_nbr + 1
    EndWhile
    PRINT " \n\r" ;two line feeds for spacing
    PRINT " \n\r"
    MENU (Tools) {Info} {Family} ;get family info for each table
    SELECT cur_name
    PRINT "      Family Members \n\r"
    PRINT "      ----- \n\r"
    field_nbr = 1
    MOVETO RECORD field_nbr
    While field_nbr <= NRECORDS("family")
      While SEARCH("Form",[Name]) = 1 ;this gets info on all Forms
        If [Name] = "Form F" THEN ;this is default Form
          MENU (Forms) {Change}
          SELECT cur_name
          SELECT "F"
          frdesc = MENUCHOICE()
          MENU ESC
          PRINT " " + [Name] + " -- " + frdesc
          PRINT " \n\r"
          field_nbr = field_nbr + 1
          MOVETO RECORD field_nbr

```

```

        EndIf
      For ndx FROM 1 To 14 STEP 1 ;gets numbered forms
        If [Name] = "Form F" + strval(ndx) THEN
          MENU (Forms) {Change}
          SELECT cur_name
          SELECT ndx
          frdesc = MENUCHOICE()
          MENU ESC
          PRINT " " + [Name] + " -- " + frdesc
          PRINT " \n\r"
          field_nbr = field_nbr + 1
          MOVETO RECORD field_nbr
        EndIf
      EndFor
    EndWhile
  While SEARCH("Report",[Name]) = 1 ;gets Report info
    If [Name] = "Report R" THEN
      MENU (Report) {Change}
      SELECT cur_name
      SELECT "R"
      frdesc = MENUCHOICE()
      MENU ESC
      PRINT " " + [Name] + " -- " + frdesc
      PRINT " \n\r"
      field_nbr = field_nbr + 1
      MOVETO RECORD field_nbr
    EndIf
  For ndx FROM 1 To 14 STEP 1
    If [Name] = "Report R" + strval(ndx) THEN
      MENU (Report) {Change}
      SELECT cur_name
      SELECT ndx
      frdesc = MENUCHOICE()
      MENU ESC
      PRINT " " + [Name] + " -- " + frdesc
      PRINT " \n\r"
      field_nbr = field_nbr + 1
      MOVETO RECORD field_nbr
    EndIf
  EndFor
  If ATLAST() THEN
    QuitLoop
  EndIf
EndWhile
If SEARCH("Form",[Name]) = 0 AND
  SEARCH("Report",[Name]) = 0 THEN
  If field_nbr=1 THEN PRINT " " +
    [Name] + " -- Table name \n\r"
  Else PRINT " " + [Name] + " \n\r"
  EndIf
  field_nbr = field_nbr + 1
EndIf
MOVETO RECORD field_nbr
EndWhile
UPIMAGE
UPIMAGE
cur_rec = cur_rec + 1
PRINT CHR(812) ;Page eject between tables
EndWhile
CLOSE PRINTER
RELEASE VARS ALL
CLEARALL
EndIf

```



Figure 5: The FAMILY script sends a report to your printer listing the table structure and family members for all tables in the current directory.

to the structure of the table itself.

Another advantage of this script is that if you store a description with your reports or forms, the description is printed too. Since Paradox allows you to store up to 14 custom forms and reports with a table, but identifies them only by number, having a printout of the descriptions makes it easier to locate the form or report that you're looking for.

Mr. Johnson makes good use of several options that are available under the {Tools} {Info} menu selection. For exam-

ple, {Tools} {Info} {Inventory} {Tables} produces a "List" table, which contains one row for each of the tables found in the current directory. {Tools} {Info} {Structure} produces a "Struct" table, which shows the field structure information for a table. {Tools} {Info} {Family} creates a table that lists the family members of the specified table. The FAMILY script works by using information that Paradox provides through these menu options.

The script obtains your report and

form descriptions in an interesting way. First, it issues the sequence of commands necessary to make your existing description available for editing. For example, MENU {Report} {Change} followed by selecting the table and choosing R, brings up the description for the R report. At this point, the previously entered description is highlighted and can be returned using the MENUCHOICE() function. So the script assigns the value returned by MENUCHOICE() to a variable called frdesc, and then uses MENU ESC to



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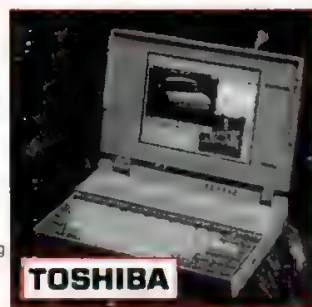
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The industry is buzzin' with VESA local bus and EPS offers the hottest performance on the market. We guarantee you'll be blown away by its incredible speed. We're talking performance! Our first EPS local bus slot is accompanied by our 'warp speed', local bus card, allowing you to achieve **40 million plus winmarks** (when tested with our EPS

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- ▶ Maxtor 130 MB IDE HD (15ms)
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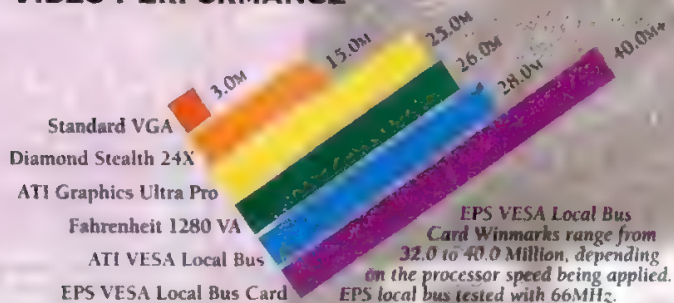
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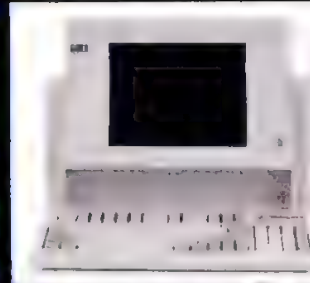
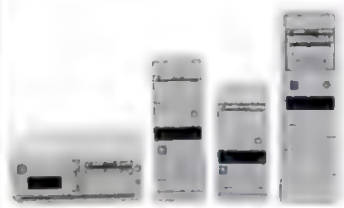
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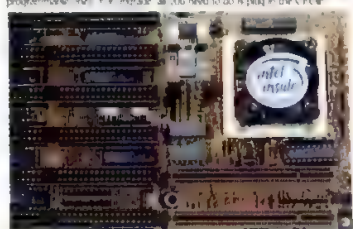


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OF TODAY PC
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Today, we are turning our competitors on their ears - Santron's new 32-Bit VESA (Video Electronics Standards Association)

Architecture systems deliver graphics up to 50 times faster than the standard SVGA. How is this possible? Most of the computers only have added graphics accelerators, however, their real-time speeds are still limited by their 80486 16-Bit AT bus. Santron's **2 VESA local bus** slots bypass the bus bottleneck by connecting directly to the 486 CPU - a real 32-bit performance for VGA, IDE Controller or network card. The VESA motherboard also comes with an **AUTO-SWITCHING OSCILLATOR** for more convenient than the programmable one. For upgrade, all you need to do is plug in the CPU.



VESA LOCAL BUS 486

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Santron 15" NON-INTERLACED FLAT SCREEN MONITOR operates at an even higher resolution of 1280x1024. Santron's POWER SUPPLY, having a MTBF (Mean Time Between Failures) greater than 150,000 hours, is specifically designed to match different exterior cases. There is no need to turn off your computer at the end of the day. The optional HEAT SINK & COOLING FAN mounted on top of the 486 CPUs will keep the CPU temperature within a safe range (32F to 185F) and extend the CPU life.



ISA 486 PCs

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- 4MB 70ns RAM Expandable to 128MB
- IDE Controller & 2 Serial/Parallel/Game Ports
- TEAC 1.2 & 1.44MB Floppy Drives
- 130MB 15MS Hard Drive
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- 14" SVGA Monitor (0.28mm 1024x768 Non-Interlaced)
- 101-Key Enhanced Keyboard
- 100-Hz Resolution 3-Button Mouse
- 100% Microsoft DOS 5.0 & Windows 3.1
- 100% One-Year On-Site Service

486SX-25.....\$1225 486DX-50.....\$1675
486DX-33.....\$1475 486DX2-66.....\$1775

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P5 PENTIUM

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ACCOMMODATES
INTEL P5 PENTIUM
MICROPROCESSOR

Santron's 486 motherboard contains a CPU socket which can accommodate even the new PENTIUM (P5) processor, the next generation Intel CPU. It, of course, remains the upgrade path from 486SX/25 all-the-way to 486DX2/66 by simply replacing the oscillator and CPU. Regardless ISA, VESA, or EISA, Santron employs standard architecture in circuit design which ensures not only a true compatibility with your add-on application boards, e.g. NOVELL, data acquisition, but also its sustainability in the market.

Unlike other clone manufacturers, Santron specializes in **CUSTOM SYSTEMS** and takes pride in building them. Our meticulous engineers master in constructing your dream machines. You may specify different video adapters: Diamond Stealth, SuperDisk 84K, ATI, ET4000, 83, or Trident 1MB; different IDE, SCSI, or ESDI hard drives; Fujitsu, Maxtor, or Conner; different motherboard architecture: EISA, Local Bus (VESA), ISA; different cases (super tower, of course), portable gas plasma, color LCD, for your specific needs. Fax/modem, tape backup units and CD-ROMs are on the list as well.

ISA 386 PCs

- Intel 386™ Microprocessor
- Math Co-Processor Support
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- 4MB 70ns RAM (2MB on SX)
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- TEAC 1.2 & 1.44MB Floppy Drives
- 130MB 15MS Hard Drive
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386DX-33.....\$1025
386SX-25.....\$ 885

CUSTOM CONFIG.

specify different video adapters: Diamond Stealth, SuperDisk 84K, ATI, ET4000, 83, or Trident 1MB; different IDE, SCSI, or ESDI hard drives; Fujitsu, Maxtor, or Conner; different motherboard architecture: EISA, Local Bus (VESA), ISA; different cases (super tower, of course), portable gas plasma, color LCD, for your specific needs. Fax/modem, tape backup units and CD-ROMs are on the list as well.

1.2.3

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All Santron systems are covered by our standard 1-year parts, 3-year motherboard, and 3-year labor warranty. We also provide one-year free on-site service through Nationwide Warranty Corporation, which has more than 800 authorized service centers in the United States and Canada. Your purchase at Santron is completely risk-free as we stand behind our products with a 30-day money-back policy. Our lifetime toll-free technical support number is available for you 6 days a week.

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486DX-50.....\$2095 386DX-33.....\$1575

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Color LCD Display.....\$1250

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Sample output from FAMILY.SC

```
Bookord Table
-----
Field Name      Field Type
-----
Cust             N*
Date             D*
Item #           S*
Vol             A3
Quant           N
Emp #            N

Family Members
-----
Bookord -- Table name
Validity VAL
Form F -- Standard Form
Form F1 --
Multirecord Order Form
Report R -- Standard Report
Report R1 -- Report By Item #
Report R2 -- Report By Customer
```

Figure 6: A sample of the output produced by running the FAMILY Paradox script.

back out of the edit.

You'll find the FAMILY script in the Utilities/Tips Forum on PC MagNet. Look for the file FAMILY.ZIP.

Graphics

DANGLING DISPLAY TYPE

❷ Is there an easy way to create hanging quotation marks in PageMaker 4.0? I want to emphasize the word *easy*, because I have to produce a large number of pull-quotes and can't afford time-consuming tricks. I'd even be willing to buy a graphics program that can hang quotes automatically.

*J. Robbins
Portland, Oregon*

► **PC MAGAZINE:** The terms *pullquotes* and *hanging quotation marks* both refer to display type. Display type—whether it's a headline, a pullquote, or a subhead—always serves two purposes. Usually set in a larger, decorative typeface, display type adds visual interest to a page. Display type can also highlight eloquent, funny, or engaging language, sparking the reader's interest. A pullquote is different from a headline because it is a catchy phrase or sentence extracted (hence, pulled) from a longer article. Pullquotes are then set in a larger point size or decorative typeface and placed

conspicuously on the page.

Hanging quotation marks are a common typographic device for display type. At large point sizes, quotation marks (and many other normal punctuation marks) create awkward indents that are visually disturbing. The solution is to position (literally hang) the punctuation outside the normal text margins.

Unfortunately, PageMaker 4.0 includes no easy, automatic way to hang quotation marks. You can fiddle with its built-in type functions but, like most jury-rigged solutions, such a workaround means more work for you. On the simplest level, you can add quotation marks to each and every line of a pull quote, then format the "extra" quotation marks with the Reverse option (found within the Type Style menu item). In effect, this makes everything but the first and last quotation marks invisible.

Providing you never have to edit the text, this down and dirty solution will work perfectly. If you must edit, though, pay special attention to those invisible quotation marks. Should they migrate to the middle of a line, they'll leave unsightly gaps, ruining the hanging punctuation effect in the bargain.

Another approach involves PageMaker's paragraph controls. First highlight the pull quote, then, using the Paragraph dialog box, set up a left indent that's the width of the quotation mark. Now create a first line outdent (or a negative indent) equal to and opposite the indent. A left indent of .08 inches and a first line outdent of -.08 will create a hanging indent. Since it's the first character in the paragraph, the quotation mark will also create a hanging quote. This method works for opening—but not closing—quote marks.

My research turned up only one graphics program—Adobe Illustrator for Windows—that hangs quotation marks automatically. In fact, it can perform the feat on all punctuation marks including periods, commas, single-quotation marks, double-quotation marks, apostrophes, hyphens, em dashes, en dashes, colons, and semicolons.

To do this, highlight your text, open the Type Style dialog

box, and choose the Hanging Punctuation option. As you can see in Figure 7, the letters fall within the column, but all punctuation marks, including the comma at the end of the first line, are placed outside the column.

This method works well because it automatically hangs both the open and closing quotation marks. To transfer this object—into a PageMaker document, save it as an .EPS file then use PageMaker's place command to import it as a picture.

Finally, to make your designs look truly professional, use typeset-style quotation marks. The ordinary double quotation marks from the qwerty keyboard are identical to inch marks. Likewise, the keyboard's single quotation marks correspond to apostrophes. Neither the inch mark nor the apostrophe is acceptable in a high-quality design. Both single and double typeset-style quotation marks are available as extended characters for many typefaces. Windows 3.1 makes it easy to access the extended character set of an installed font. Here's how:

Open up the Character Map program (found in the Accessories Program Group) and choose a font from the drop-down list. To see an enlarged version of any individual character displayed on the screen, click on the character and hold the mouse button down. Use the Select and Copy buttons to copy one or more characters to the Windows Clipboard. Now switch to your current application (Adobe Illustrator, in this case) and select the same font that you used in the Character Map utility program. Then position your text cursor at an appropriate

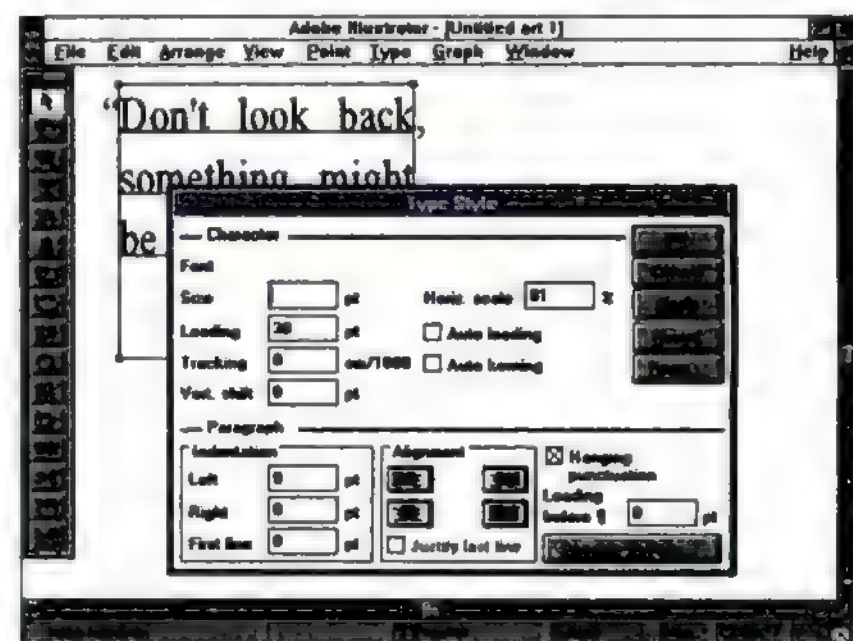


Figure 7: You can create true hanging punctuation in Adobe Illustrator. Notice that both the quotation marks and the comma are positioned outside the text margins.

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Display controls are beside the
screen on the right.

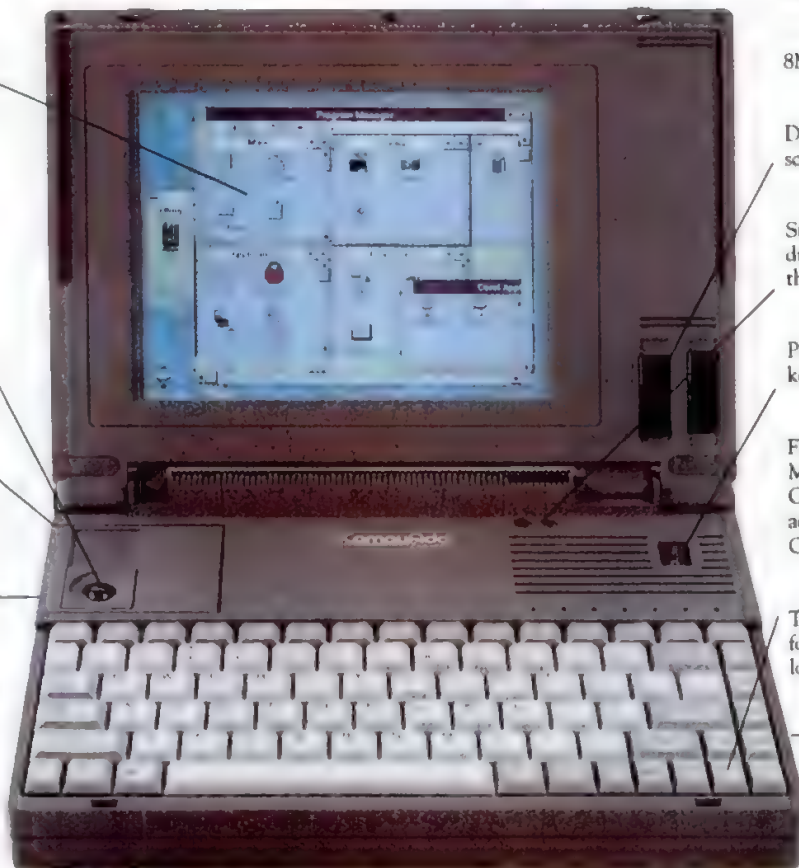
Standby button shuts down
display and drives when you close
the lid but preserves data.

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CIRCLE 128 ON READER SERVICE CARD

spot and use the Paste command (found on the Edit menu) to insert the characters from the Clipboard into your document.—*Luisa Simone*

EPS FOR EVERYONE

❓ I've spent a lot of time and effort developing a company logo using PageMaker's type and drawing tools. Now that I have the perfect logo, I want to use it in a number of different documents. So far, I've cut and pasted the logo between documents using the Windows Clipboard. But it would be more efficient if I could export the logo as a graphics file and then use the Place command to incorporate it into new publications. I tried using PageMaker's Export command and found I could only export text files. Is there any way to save my logo in a standard graphics format?

*William Crary
Somers, New York*

► **PC MAGAZINE:** It's important to remember that although PageMaker contains several drawing tools, it's not intended to be a drawing program. So it's understandable that PageMaker doesn't offer export filters for graphics file formats. If you want access to a variety of file formats, such as the Computer Graphics Metafile format (.CGM) or the Windows Metafile format (.WMF), or if you're printing to a PCL (Hewlett-Packard's Printer Control Language) device such as the HP LaserJet, you must recreate the logo using a dedicated illustration program such as CorelDRAW, Aldus FreeHand, or Adobe Illustrator. But if you work in a PostScript environment, you can generate a standalone graphics file from within PageMaker.

The technique actually has very little to do with PageMaker's functions and relies instead on the generic Windows PostScript driver. In a nutshell, the Windows PostScript driver contains two options. The first—and best known—allows you to print directly to a PostScript printer. The second option lets you "print" your PageMaker publication to an Encapsulated PostScript (.EPS) file.

Assuming the document that contains your logo is already open, just follow these steps to create an .EPS file. On the File menu, click the Print command.

Make sure the current printer is a PostScript device. Click the Setup button to open the Windows Printer Control Panel.

Once you're in the Printer Control Panel, click the Options button. In the Options dialog box (shown in Figure 8) make the following changes:

- Select Encapsulated PostScript File in the Print To box.
- Click Send Header to deselect it.

This last option requires an explanation. Whenever you print to a PostScript device, containing general information is downloaded to the printer.

Since you intend to incorporate this .EPS file into another document, the proper header for the main document would be downloaded first. Including header information in the .EPS file could cause conflicts and printing problems. For example, subsequent pages of your document might fail to print.

You'll also notice that the Windows Control Panel allows you to type in the name of your output file. You can certainly type in a filename here. But be warned, each time you generate an .EPS file, Windows will use the same filename and overwrite the previous version. In the long run, it's easier to leave this box empty, because it will force PageMaker to prompt you for a unique filename later on in the process.

After you've checked all of the appropriate option boxes, click OK in all three dialog boxes to begin generating the .EPS file. At this point PageMaker prompts you for a filename. Type in the drive, path, and a filename that includes the .EPS extension. Now, whenever you want to include your logo in another document, simply use the Place command to locate and import the .EPS file.

This technique is really flexible and can be used to generate an .EPS file from any Windows-based application. Best of all, the .EPS file has all the attributes of a device-independent, vector-based graphic. Primarily, this means that you can resize the picture—making it smaller or larger—without degrading the quality of the final printout.

There are a few drawbacks, though, that should be noted. For example, the

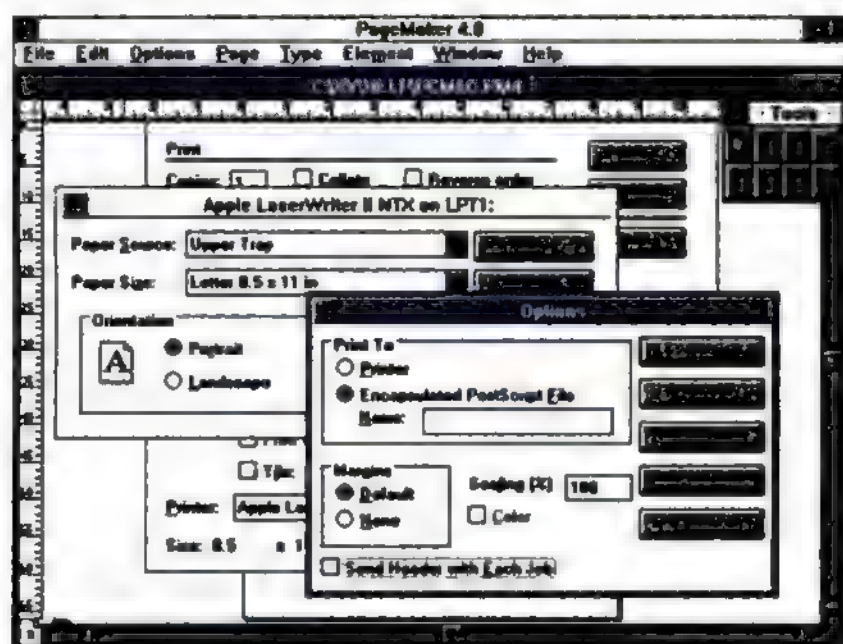


Figure 8: By using the Windows Control Panel, you can choose to create an Encapsulated PostScript file rather than sending the image directly to a printer.

Windows Printer Control Panel cannot attach a viewable TIFF image to the .EPS file. As a result, when you import the .EPS file into PageMaker you won't see a screen representation of the actual picture. Instead, a simple gray bounding box will appear on-screen. You can use the bounding box to size, position, and even crop the file—albeit imprecisely.

Likewise, because an Encapsulated PostScript file is nothing more than a subset of the PostScript page description language, you must print the .EPS file to a PostScript device. But don't be fooled: An .EPS file is not identical to a PostScript printer file. If you want to send a PostScript printer file (that is, a file that can drive a Linotronic imagesetter) to your service bureau, you can't employ this method. Instead you must use the Windows Printer Control Panel to connect your PostScript printer to the port designated as "File."—*Luisa Simone*

Networking

AS/400 PC SUPPORT (REVISITED)

✓ **TIP** As an advisory systems engineer for IBM, I was delighted to find information on AS/400-to-PC connectivity in the June 30, 1992, issue, but I'd like to comment on a few points.

IBM offers both Token-Ring and Ethernet adapters for the AS/400. Although Token-Ring might be viewed as more efficient for heavy traffic, Ether-

net is a viable alternative, so it's unnecessary to use a Token-Ring gateway for AS/400 access as the article suggests.

AS/400 PC Support is considered an AS/400—not a PC—product. Thus, while it contains floppy disks to aid in the installation of the first PC, it actually ships on an AS/400 tape. Subsequent installation disks can be customized on the AS/400, then built on a PC.

For now, the Rumba/400 product from Wall Data must be used with PC Support under Windows. Rumba/400 offers up to 32 sessions per PC while PC Support offers 7. Rumba/400 will only work with the PC Support Router loaded. IBM will make Version 2, Release 2, of AS/400 PC Support (which adds Rumba as a feature) available on December 18, 1992. A series of DLLs we've written will also make PC Support a truly Windows-compliant program. In addition, the upcoming release will permit other parts of PC Support to be moved to upper memory in DOS.

Those interested in further information should obtain the \$5.45 IBM publication *AS/400 PC Support Coexistence with Microsoft Windows and Novell NetWare* (pub GG24-3637). This 276-page book includes 26 scenarios with listings of the CONFIG.SYS, AUTOEXEC.BAT, and other pertinent files.

Darryl Johns
Mount Laurel, New Jersey

► **PC MAGAZINE:** Although IBM does offer an Ethernet adapter for the AS/400, I still recommend a Token-Ring connection. Any machine you use to run Novell's NetWare for SAA NLN can use Novell's internal routing software to link all other media and cable systems to the Token-Ring connection.

You can get the IBM book described by Mr. Johns from your IBM dealer or representative.—*Frank J. Derfler, Jr.*

COAXIAL WIRING HUB CONNECTIONS

❓ In your October 13, 1992, column you mentioned the availability of BNC hub modules that allow coaxial cable to be used in a star rather than a bus topology. Which companies manufacture such a product? Can I convert my existing bus

configuration without changing adapter cards and NetWare drivers?

Douglas W. Evans
Scranton, Pennsylvania

► **PC MAGAZINE:** All major manufacturers of enterprise wiring hubs offer slide-in modules with BNC connectors for thin Ethernet. A chart on page 312 of the November 10, 1992, issue shows the thin Ethernet configurations available from six of those manufacturers ("Empire Builders: 6 Enterprise Hubs," *PC Magazine*, November 10, 1992). Using the high-end products reviewed in that article, the cost comes to over \$200 per port (even for a wiring hub with no network management facility)—and you'd need 24 nodes to drive the price that low.

IMC Networks Corp. offers an alternative with more modularity and a lower up-front cost than enterprise wiring hubs. In one small cabinet, the IMC LANrepeater/8 lets you mix and match individual connection modules for several different cabling schemes. You can configure a LANrepeater/8 with eight BNC connector modules for just over \$200 per node. You need not make any change in LAN adapters or drivers to go from a classic bus topology to a segmented configuration, and each of IMC's BNC modules features its own internal terminator so you don't need one at the end of the cable connected to the LANrepeater/8.

By stringing a few nodes on each cable segment, you can reduce the number of BNC modules needed yet maintain most of the isolation advantages you get from a segmented network.

If you have nodes in different buildings, you can set up a LANrepeater/8 with thin coax or 10BaseT UTP modules (one 8-slot cabinet accommodates up to 16 10BaseT connections) for the stations within each structure and add a module using the fiber-optic inter-repeater link (FOIRL) standard, which enables the use of fiber-optic cabling between buildings.

The LANrepeater/8 costs more on a per-port basis than standard 10BaseT workgroup hubs from companies such as Asante, D-Link, or Hewlett-Packard, but offers unique flexibility at a fair price. Contact IMC at 800-624-1070 or 714-724-1070.—*Frank J. Derfler, Jr.*

RECEIVING HF RADIO WEATHER FAX

❓ You've commented about using computers on boats before. What do I need to receive weather fax transmissions using the PC on my boat?

Richard Hendricks
Lafayette, Louisiana

► **PC MAGAZINE:** You can combine your PC with your vessel's high-frequency (HF) radio to receive weather fax transmissions from stations around the world. You can even receive infrared and visual camera weather photos directly from overhead satellites and have them appear on your PC's screen. DF Crane Associates in San Diego, California (619-233-0223), and MFJ Enterprises in Starkville, Mississippi (800-647-1800 or 601-323-5869), offer a variety of products that provide the hardware and software you need to add to your radio and PC to link them.

The \$119 DF Crane Item 500 AEA-FAX includes a demodulator (which connects between the radio's headphone jack and a 9-pin RS-232 PC port) and a program that will run on any PC with 640K of RAM and a serial port. The software captures the incoming images, letting you set everything to automatic so you can tend the boat during transmission (which can take several minutes for one image). You can send the image to printers capable of Epson Model 80 or HPGL emulation.

The program sniffs out the video adapter and sets itself up for your computer. Although not fancy, it provides a few simple menus and works effectively. On the other side of the system, though, you'll encounter some rougher sailing. It's not easy to tune in a fax signal on HF radio. You need a stable receiver and a good ear for the fax tones. But once you get the signal properly tuned, image quality is good.

MFJ Enterprises offers two more sophisticated, easier to use demodulators than the DF Crane 500. The \$279 MFJ Multi-Mode provides automatic signal analysis, making tuning easier. Its demodulator will create displays on your PC of slow-scan television and packet pictures from the amateur radio frequencies. You can also use it to receive radio

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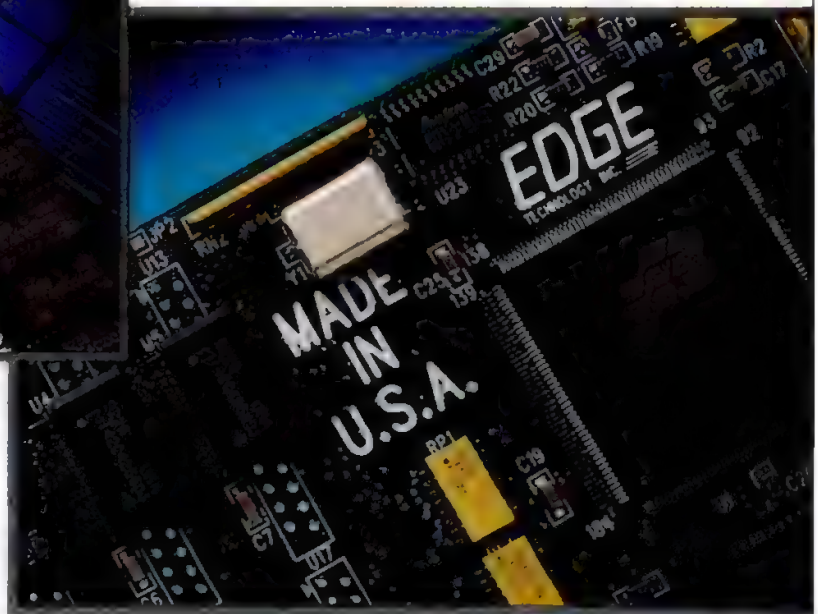
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CIRCLE 112 ON READER SERVICE CARD

teletype news, weather broadcasts, and Morse code transmissions. The software is easy to use, provides menu-driven options and assistance, and needs only 512K of RAM. MFJ does specify a PC with at least a 10-MHz CPU so the processor can keep up with data coming in through the serial port.

The \$995 DF Crane Item 610 Satellite System includes the HF capability, but also provides a scanning receiver for satellite transmissions—and it's a thrill to receive the images directly from orbit. These are the same ones used by television weather forecasters. The setup requires a good antenna system. Mount the antenna furnished with the kit as high as possible in order to clear obstructions and electrical noise.

Together with your PC and an appropriate radio receiver, these radio systems provide a good substitute for a local weather forecaster when you're miles from land, but they're educational and a lot of fun when you're landlocked, too.—*Frank J. Derfler, Jr.*

THE ARCNET STANDARD

② Your book, *The PC Magazine Guide to Connectivity*, notes that companies are moving to make ARCnet a standard. Your LAN fundamentals article that appeared in the March 31, 1992, issue implies otherwise, though, saying that we should be wary of ARCnet and stick with IEEE or ANSI standards. Is there an IEEE committee or subcommittee working to make ARCnet an 802 standard?

*Danny Monfette
Cap-Rouge, Quebec
Canada*

► **PC MAGAZINE:** Two events currently drive the ARCnet front. First, in October, 1992, ANSI (the American National Standards Institute) specified the ARCnet protocol as the "ATA/ANSI 878.1 Local Area Network Standard." The IEEE's (Institute of Electrical and Electronics Engineers) formal role, however, is standards *design*, so it has no committee working on ARCnet, which is now about 15 years old. ANSI, by contrast, standardizes *existing* specifications. (Similarly, FDDI (which is widely accepted) is not a standard with the IEEE but is under ANSI.) Organizations with poli-

cies dictating the purchase of products that follow open standards can now refer to ANSI ARCnet when requesting bids.

Datapoint fired the second loud shot in the ARCnet world with its introduction of ARCNETPLUS, which signals at 20 megabits per second but can intermix with existing 2.5Mb ARCnet wiring systems, hubs, and adapters. You can put ARCNETPLUS in nodes that would benefit from faster service while leaving the rest of the network unchanged. You might, for example, replace the old-style card currently in your file server with the \$695 Datapoint ARCNETPLUS LAN adapter (which services requests at both 2.5Mb and 20Mb). You can equip the few fast PCs needing high-speed network access with 20-megabit hardware and never touch the remaining nodes. You must, however, upgrade any wiring hub that provides the first point of contact for a 20-megabit adapter. Intervening hubs require no changes, though. Datapoint sells an \$1,195 hub card that fits into a PC, provides four ports, and also serves as the host machine's ARCNETPLUS LAN connection.

I still like ARCnet. It works reliably, and the 2.5Mb signaling speed is not a limitation in typical office installations—few PCs can move data faster than that under the most ideal (let alone demanding) conditions. The adoption of the ANSI standard and the introduction of 20 megabit service that you can intermix with existing nodes adds modern appeal to a proven technology. Contact Datapoint Corp. at 800-334-9968 or 512-593-7000 for more information on ARCNETPLUS.—*Frank J. Derfler, Jr.*

Languages

AN ASSEMBLY PASSWORD ROUTINE

✓ **TIP** Many programs require the use of a password query routine to ensure security. Such a routine prompts the user for a string without echoing that string back to the screen. In order to fill this need, I have written an assembly password query routine.

*Eric Tong
Bronxville, New York*

► **PC MAGAZINE:** Password protection is a common requirement in today's knowledge-sensitive business environment. Every language has some method of reading keystrokes without echoing them to the screen, but programmers who write to the DOS API (Application Programming Interface) have several choices. Mr. Tong's program provides some insight on how to decide which function is appropriate. I have used Mr. Tong's assembly language routine as the inspiration for the short GETPASS.ASM program shown in Figure 9. I'll discuss the decision process for determining which of the three similar DOS function calls the program should use, and then I'll discuss the program itself.

GETPASS.ASM is a demonstration program that contains a main routine that prints a prompt to the user and calls the GetPassword procedure. (You can download it from the Programming Forum on PC MagNet archived as GETPAS.ZIP.) The current password, PC Magazine, is passed by pushing a pointer to the password on the stack. If the user enters a password that matches the current password, GetPassword returns with AX=0; otherwise, AX is nonzero. GETPASS then exits with a return code that matches the value returned by GetPassword. Note that GETPASS is only a demonstration program for the routine GetPassword, since the password is not only hard-coded but also stored in an unencrypted format. However, you can easily modify it to allow different passwords that are encrypted.

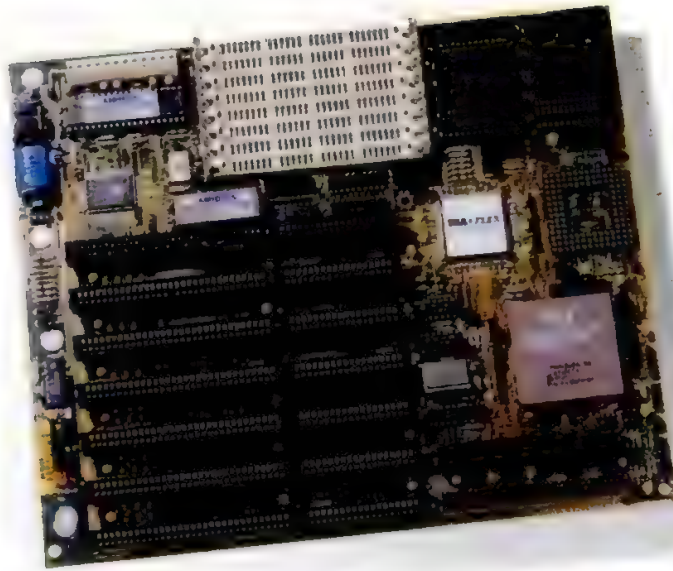
The GetPassword procedure is the routine that performs the password compare. The function uses the DOS Direct Console Input (Int 21h AH=7) function to read characters from the keyboard without echoing them to the screen. The Direct Console Input function is one of three DOS functions that can read a character without echoing it back to the screen. The other two are Function 6, Direct Console I/O (Int 21h AH=6) and Function 8, Read Character without Echo (Int 21h AH=8). There are other ways to read keys, including using the BIOS and reading the keyboard I/O port directly. In this example, however, GetPassword stays at the DOS level so that it's more portable.

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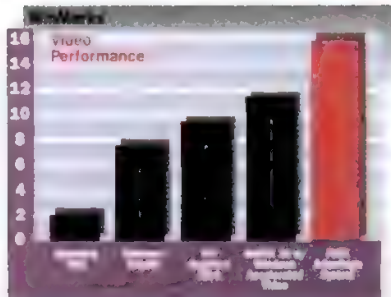
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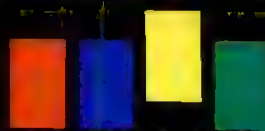
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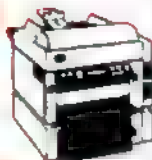
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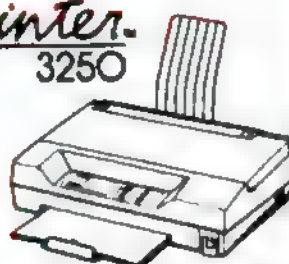
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GETPASS.ASM
Complete Listing

<pre> code segment assume cs:code org 100h main: current_pass db "PC Magazine",0 askmsg db "Enter Password:",13,10,"\$" rightmsg db "Correct password!",13,10,"\$" wrongmsg db "Incorrect password!",13,10,"\$" main_1: cld ;Set up string dir mov ah,9 mov dx,offset askmsg ;Prompt the user int 21h ; for the PW add sp,4 ;Clean up stack. push cs mov ax,offset current_pass push ax ;Push ptr to call GetPassword ; PW and call mov dx,offset rightmsg or ax,ax je main_2 mov dx,offset wrongmsg main_2: push ax ;Save return code mov ah,9 ;DOS print string int 21h pop ax ;Rest rc in AL mov ah,4ch ;DOS Terminate int 21h ;----- ; GetPassword - Read a password from the user and compare to ; current PW. ; Entry: Long pointer to current ASCIIZ password on stack. ; Exit: AX = 0 if correct password entered. ; Calling routine must remove parameters from the stack ;----- GetPassword proc near assume cs:code push bp </pre>	<pre> mov bp,sp ;Create stack frame push bx ;Save registers. push dx push di push es mov di,ss:[bp+6] ;Get ptr to password mov es,di mov di,ss:[bp+4] xor bx,bx ;Clear PW pass flag mov ah,7 ;DOS Console I/O int 21h or al,al ;See if extended key jne GetPW_2 mov ah,7 ;Get extended key int 21h ; and replace with ; 1 value. mov al,13 ;See if return cmp al,13 je GetPW_3 sub al,es:[di] ;Compare characters or bl,al ;OR into pass flag cmp byte ptr es:[di],8 ;See if at end of PW je GetPW_1 inc di ;No, inc pw pointer jnz short GetPW_1 or bl,es:[di] ;OR Terminating zero. mov ax,bx ;Copy pass flag pop es ;Restore registers pop di pop dx pop bx mov sp,bp pop bp ret endp code ends main end </pre>
---	---



Figure 9: This assembly program prompts the user to enter a password, receives characters from the keyboard without displaying them, and checks them against a stored password. If the password typed is correct, GetPassword returns with AX = 0, and the program displays "Correct password!"

tions, these three seem to fulfill the same need. While they are similar, each has its own special purpose. The art of DOS programming lies in choosing the function call that's best suited to each situation.

Function 6, Direct Console I/O, can both read from and write to the standard input and output devices. If DL is set to 0FFh, the function reads a character from the standard input device, normally the keyboard. If the function returns with the Zero Flag cleared in the Flags register, the character read is returned in AL. If the Zero Flag is set, no characters are available and AL is undefined. If an extended key has been pressed, such as one of the function or cursor keys, the function returns 0, and the function must be called again to read the extended key code. If DL is a value other than 0FFh, that value is written to the screen or, more precisely, to the standard output device.

DOS Function 7, Direct Console Input, can also be used to read a character from the standard input device. This function is different from Function 6 in that it will wait for a key if none is currently available. As with Function 6, you

must call Function 7 twice if an extended key was pressed.

DOS Function 8, Read Keyboard Without Echo, differs from Function 7 in that DOS checks for Ctrl-C and Ctrl-Break before returning the character to the calling program. If a Ctrl-C or Ctrl-Break is detected, DOS performs an interrupt 23h. Since the default action for an INT 23h is to terminate the program or batch file, a program that doesn't want this action must provide a routine to handle occurrences of this interrupt. As with Functions 6 and 7, Function 8 reads from the standard input device.

GetPassword uses Direct Console Input (Function 7), because in this situation it provides the function needed with the least amount of effort. If Function 6, Direct Console I/O, had been used, the GetPassword routine would have had to check the Zero Flag and continually loop on the DOS call until a key was ready. While this may not seem to be much of a bother, DOS programs can't simply loop waiting on a keypress, because this would lock out other programs that may need to take control, such as TSRs.

Any DOS program that runs in a loop

for a period of time should yield control every so often by performing an interrupt 28h (MS-DOS Idle Handler). Interrupt 28h, first used in DOS 2.0, is one way that TSR (terminate and stay resident) programs know it is safe to take control of the system. When calling a DOS function that waits on the keyboard, such as Function 7, DOS automatically performs an Idle interrupt as well as any other idle processing. So by not using Function 6, the GetPassword routine is freed from bothering with the Idle interrupt.

On the surface, Function 8, Read Keyboard without Echo, looks identical to the Console Input function (Function 7). In this case, looks are deceiving. If GetPassword used Function 8, it would have to take into account the possibility of a Control-C interrupt. While DOS has a default handler for the resulting INT 23h, a well-written routine that could cause this interrupt should provide its own interrupt handler.

Aside from the nonecho read of the keyboard, GetPassword has a few other noteworthy features. First, the use of a temporary buffer is avoided by comparing each character with the current pass-

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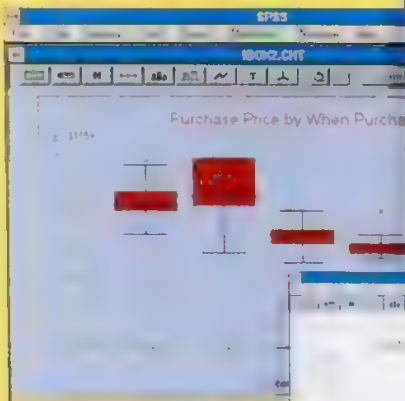
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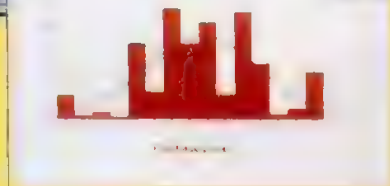
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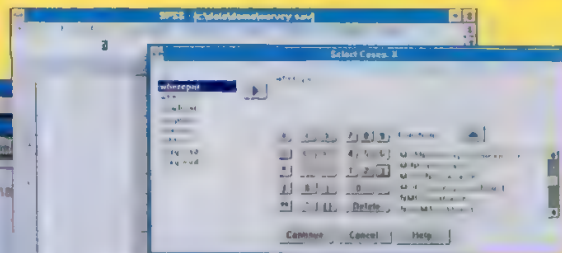
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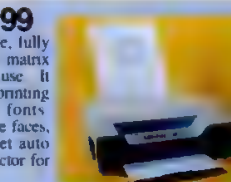
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Wired for Sound Pro \$39
This Windows utility for your sound card has 200 realistic sounds. Add personality by attaching sounds and voices to any Windows application, message, icon, or dialog box. The Talking Alarm Clock and Talking Calendar tell you where to be and whom to see. You also get 400 ICONS that talk, 100 cursors, Talking Calculator, Talking Solitaire, Minesweeper, 10 video screen savers, and four other great programs. For sound without hardware ask for Wired for Sound 2.0. Call 800-551-4547 for a live demo then call FastMicro to order.

any Windows application, message, icon, or dialog box. The Talking Alarm Clock and Talking Calendar tell you where to be and whom to see. You also get 400 ICONS that talk, 100 cursors, Talking Calculator, Talking Solitaire, Minesweeper, 10 video screen savers, and four other great programs. For sound without hardware ask for Wired for Sound 2.0. Call 800-551-4547 for a live demo then call FastMicro to order.

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Novell Network v3.11

Network network software allows you to share software, data files, printers and more. Support DOS, Windows and OS/2 work stations, connect printers, modems and faxes and automatically back up your data every night. Works with any network card including Token Ring, Arcnet and FastData Ethernet card.

Network v3.11 5 User \$579
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Microsoft Access \$89



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Read and write foreign desktop data concurrently, including dBASE III PLUS & dBASE IV, Paradox 3.0 & 3.5 and Btrieve formats. Special introduction price while supplies last.

Lotus Organizer \$89

Lotus Organizer is the personal information manager for windows that includes calendar, to-do list, planner, address book, note pad and anniversary. With its traditional notebook format, Organizer feels like an old friend right from the start. The six tabbed notebook sections are easily customized and work together to help you organize your schedule, prioritize task, contact clients and just get more done!



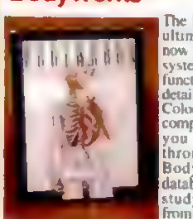
Q+E DataBase Editor \$189

Q+E Database Editor 5 brings corporate data to your desktop. Includes professional reporting features, time saving icon bar, Q+E Query Builder, customizable forms, and database macros for your favorite applications. Supports AS/400, Btrieve, dBase, DB2, Excel, Ingres, Netware, SQL, Oracle, OS/2 DBM, Paradox, SQL Server, Sybase, Tandam Nonstop SQL, text and XDB.

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BodyWorks \$39



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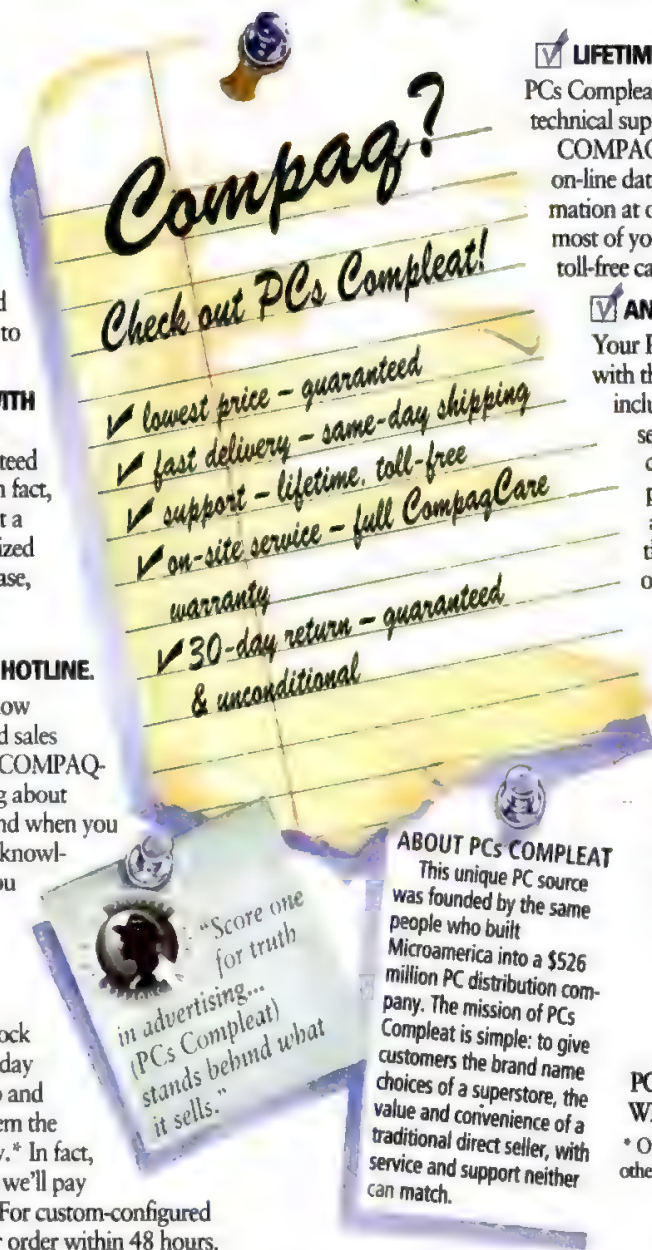
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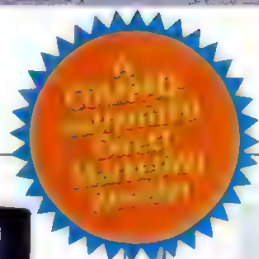
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You can pay for your order with most major credit cards. We add no surcharges, and your card is not charged until your order is shipped. We also accept company or personal checks, money orders, wire transfers, CODs, APOs, FPOs, and purchase orders.

CIRCLE 268 ON READER SERVICE CARD



Contura 25MHz 386SL

- 4MB RAM, expandable to 12MB
- 64KB cache
- 120MB hard drive
- Weight 6.2lbs
- MS DOS 5.0, Windows 3.1, PFS: Window Works
- Compaq trackball

Call for pricing on other models

\$2069

Lease for \$75.93/month



Contura 25MHz 386SL Color

- 4MB RAM, expandable to 12MB
- 64KB cache
- 84MB hard drive
- Weight 6.7lbs
- MS DOS 5.0, Windows 3.1
- Compaq trackball

\$2359

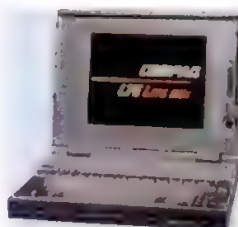
- 120MB hard drive configuration

\$2649

Call for pricing on other models

\$2359

Lease for \$86.58/month



LTE Lite 25MHz 386SL Color

- 4MB RAM, expandable to 20MB
- 64KB cache, 84MB hard drive
- Active matrix color display
- Weight 6.5lbs
- MS DOS 5.0, Windows 3.1
- Built-in trackball

\$3299

- 120MB configuration

\$3589

Call for pricing on other models

\$3299

Lease for \$121.07/month



Prolinea 25MHz 386SX

- 2MB RAM expandable to 16MB
- 84MB hard drive

\$939

Prolinea 25MHz 486SX

- 4MB RAM expandable to 32MB
- 240MB hard drive

\$1399

Includes MS DOS 5.0, Windows 3.1 and Compaq mouse
Monitors priced separately
Call for pricing on other models

\$939

Lease for \$50/month

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Monitor priced separately
Call for pricing on other models
Lease for \$50/mo.

\$939



AST
Advanced Systems Technology
Bravo

- 4MB RAM
 - 120MB hard drive
 - MS-DOS, Windows 3.1, Mouse
- | Processor | System Only | AST VGA Monitor |
|-----------|-------------|-----------------|
| 386SX33 | \$979 | \$1369 |
| 486SX25 | \$1049 | \$1459 |
| 486DX33 | \$1139 | \$1819 |
| 486DX2/66 | \$2179 | \$2539 |
- Lease for \$50/mo

\$979



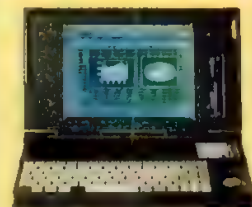
LEADING EDGE
A Daewoo Telecom Company

- 486 Systems
- 1.44MB and 1.2MB floppy drives
- Local bus slot, 1MB video RAM

Processor	Drive	Desktop	Monitor
386	10"MB	\$1069	\$1139
386	14"MB	\$1239	\$1299
486	14"MB	\$1519	\$1599
486	21"MB	\$1649	\$1729
486	21"MB	\$1799	\$1879
486	21"MB	\$2099	\$2149

Color VGA monitors start at \$229.99
Lease for \$50/mo

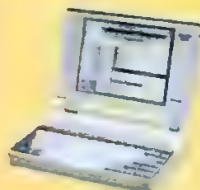
\$1069



LEADING EDGE
A Daewoo Telecom Company

- 25 MHz 386SX
 - 4MB RAM, 80MB hard drive \$1449
 - 25 MHz 386SL Plus
 - 2MB RAM, 80MB hard drive \$1749
 - 25 MHz 386SL Color
- | Hard Drive | 2MB RAM | 4MB RAM |
|------------|---------|---------|
| 60 MB | \$2149 | \$2249 |
| 80MB | \$2219 | \$2299 |
| 120MB | \$2479 | \$2549 |
- Lease for \$53.18/mo

\$1449



TOSHIBA

- T1800SX 386SX20
 - 2MB RAM, 60MB hard drive \$1339
 - T3300SL 386SL25
 - 2MB RAM, 120MB hard drive \$2199
 - T4400C 486SX25
 - 4MB RAM, 120MB hard drive \$3549
- Lease for \$50/mo.

\$1339



TEXAS INSTRUMENTS

- TravelMate WINSILC 25
 - 25 MHz 486SLC
 - 2MB RAM, 60MB hard drive \$1749
 - 4MB RAM, 120MB hard drive \$2399
 - 4MB RAM, 120MB hard drive \$2829
- Lease for \$118.87/mo.

\$1749



COMPAQ

- Contura 3/25
- Trackball
- MS-DOS, Windows 3.1

Display	Hard drive	Price
Mono	120MB	\$2149
Color	84MB	\$2449
Color	120MB	\$2749

Display	Hard drive	Price
Color	84MB	\$3499
Color	120MB	\$4099

Lease for \$78.87/mo.

\$2149



AST
Advanced Systems Technology
Power Exec

- 4MB RAM
 - Windows 3.1
 - Trackball, 2 PCMCIA slots
- | Processor | Hard drive | Price |
|-----------------------|------------|--------|
| 486SL25 Mono | 120MB | \$2499 |
| 486SL25 Passive Color | 160MB | \$3199 |
| 486SL25 Active Color | 200MB | \$3749 |
| 486SL25 Mono | 200MB | \$2949 |
| 486SL25 Passive Color | 200MB | \$3649 |
| 486SL25 Active Color | 200MB | \$4449 |
- Lease for \$91.71/mo.

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CIRCLE 092 ON READER SERVICE CARD

PCM-2/93A

word while it is being read. Note that by testing each character as it is entered, there is no way to correctly process the backspace key. On the other hand, with this method, the backspace key could be part of the password!

As each character is entered, the character in the password string (pointed to by ES:DI) is subtracted from the character entered. The difference is then logically ORed with register BL, which was initialized to 0 at the start of the routine. If the characters are the same, the difference is 0 and BX will remain 0. If the character entered is different from the character in the password, BX will become nonzero. After each character, the pointer to the password (ES:DI) is incremented to point to the next character in the password unless the end of the password has been reached. To confirm that the password has been completely entered, indicated by the user pressing the Enter key, the current password character (pointed to by ES:DI) is ORed with the pass flag in BL.

If the pointer is pointing to the terminating 0 and therefore the end of the current password, the OR has no effect on the pass flag. If, however, the user has only entered in the first few characters of the password, the pointer will be pointing to another character making the pass flag nonzero. If, at the end of the password compare, BX is still 0, the password entered must be identical to the current password.

The GetPassword routine also makes no assumptions about the relationship between the segments. Where necessary, GetPassword uses segment overrides to explicitly reference the address to the data on the stack. This is particularly important since the Intel processors assume Base Pointer plus offset ([bp+offset]) references are in the Data Segment, not the Stack Segment. Also, all registers used by GetPassword except AX are saved at the start of the routine and restored before the routine returns.

Picking the proper DOS function is more than just grabbing the first function that appears to do the job. It is a process of examining exactly what each function does. GetPassword also demonstrates a number of good assembly language practices; among those are the judicious use of memory, the saving of the registers,

and the attention to segment assumptions. These practices make this assembly language routine simple to imbed in high-level languages.—*Douglas Boling*

Accessories

RELIEF FOR CARPAL TUNNEL SYNDROME

❗ I was recently diagnosed as having Carpal Tunnel Syndrome (CTS), which makes it very painful for me to use my keyboard and mouse. I've heard that there are add-on devices that can help prevent CTS and maybe relieve some of the pain for those who already have it. Do you have any information on this topic?

N. Friedman
Brooklyn, New York

► **PC MAGAZINE:** Carpal Tunnel Syndrome is one of the most common forms of the cumulative trauma disorders and is caused by repetitive hand motions, especially those done with the wrist bent.

In an attempt to minimize the chances of developing CTS, a number of computer vendors have designed keyboard add-ons that keep your wrists in the proper position when you are typing. Many of these devices were discussed in the February 25, 1992, issue of *PC Magazine*, in the "Healthier Typing with Keyboard Enhancements" sidebar that appeared in the feature on replacement keyboards. These devices range from the \$49.95 Wrist Pro, a simple staircase-like wrist support (Wrist Pro, 16100 N. Outer Forty, #250, Chesterfield, MO 63017; 800-348-8633, 314-532-2827); to the \$99.95 Wrist Trolley, which has padded rolling platforms on a track and attaches to a desk (MicroComputer Accessories, 9920 LaCienega Blvd., P.O. Box 17032, Inglewood, CA 90308; 800-521-8270, 310-645-9400).

If all you need to do is keep your wrists flat and level with the keyboard, you might want to try the Keyboard Buddy (Computer Expressions, 4200 Mitchell St., Philadelphia, PA 19128-3593; 800-443-8278, 215-487-7700), a simple 3- or 3.5-inch cloth-covered, rubberized pad that's the same height as most keyboards.

It sits in front of the keyboard, giving your wrists a solid resting place while you're typing. Computer Expressions sells Keyboard Buddys in bulk quantities of 36 or more (for \$5.50 each); you can even get your company logo printed on top. You can order individual Keyboard Buddys through various catalogs, such as Lexmart (\$9.99).

One culprit that's often overlooked when you are trying to avoid or ease CTS is the mouse. Using the keyboard never bothered me, but I found that extensive mouse use did. Computer Expressions again comes to the rescue with the Mouse Buddy, a smaller version of the Keyboard Buddy that works with both rounded- and straight-edge mice. The Mouse Buddy can be used in one of two ways, depending on the size of your hand: It can be attached to the mouse with a piece of velcro if you have small hands, or positioned at the edge of the mouse pad to provide wrist support if you have larger hands. Again, Computer Expressions sells Mouse Buddys direct in bulk quantities of 36 or more (\$4.50 each) with your company logo printed on them, or you can order through various catalogs. Datacalc sells them for \$8.95 each.

There's a great deal of information available on CTS and how you can avoid it. *PC Magazine* Contributing Editor Winn L. Rosch covered the causes of CTS and a number of other PC-related health problems in "Does Your PC—or How You Use It—Cause Health Problems?" (*PC Magazine*, November 26, 1991). The American Physical Therapy Association distributes a booklet called *What You Need to Know About Carpal Tunnel Syndrome: A Physical Therapist's Perspective*, which discusses the symptoms of CTS and includes several tips and exercises you can follow to prevent CTS or limit its effects. Single copies of the booklet are free; to get a copy, just send a self-addressed, stamped business-size envelope to: Carpal Tunnel Syndrome, APTA, P.O. Box 37257, Washington, D.C. 20013.

The most important point to remember is that CTS can be easily treated if it's caught early enough. If you work in a high-CTS-risk occupation and begin experiencing any of the early symptoms, see your doctor as soon as possible.

—*Joe Salemi*

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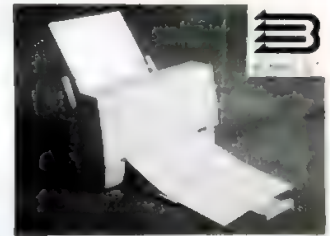
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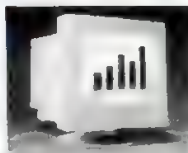
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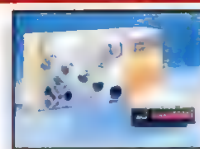
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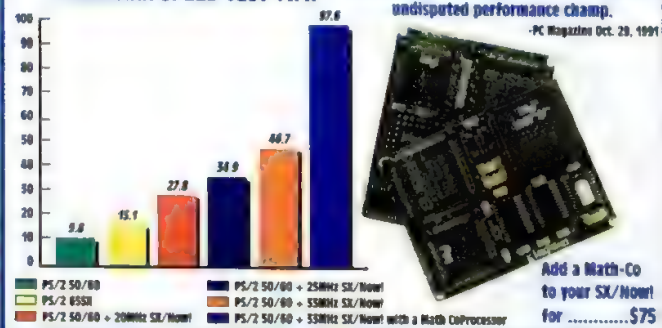
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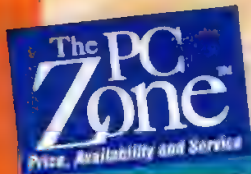
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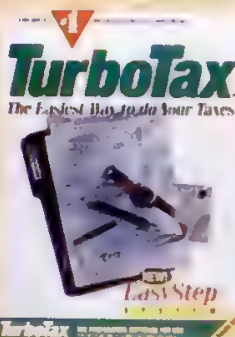


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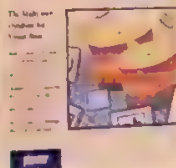
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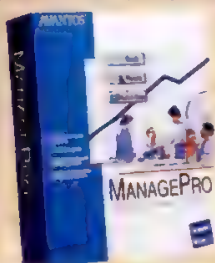
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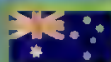


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U.S. Robotics Courier V.32bis	\$995	YES	YES	NO	NO	NO	NO
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Editor's Choice: ZyXEL U-1496E
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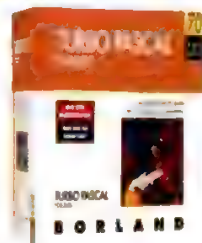
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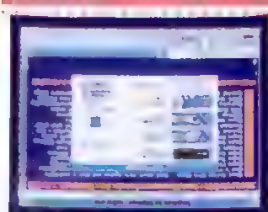


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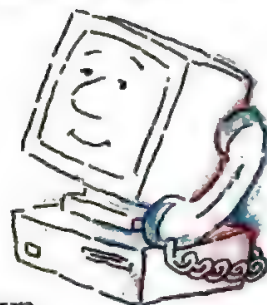
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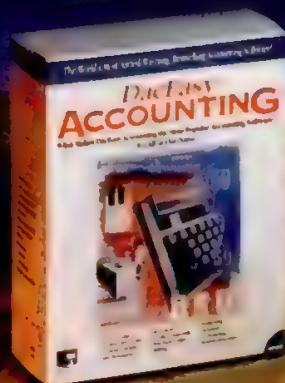
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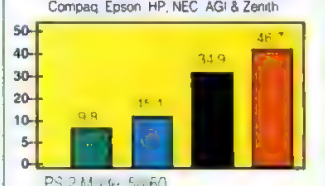
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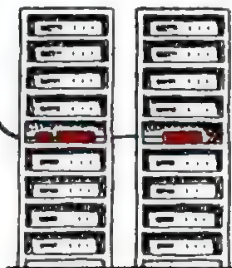
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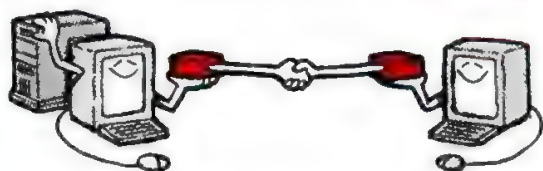
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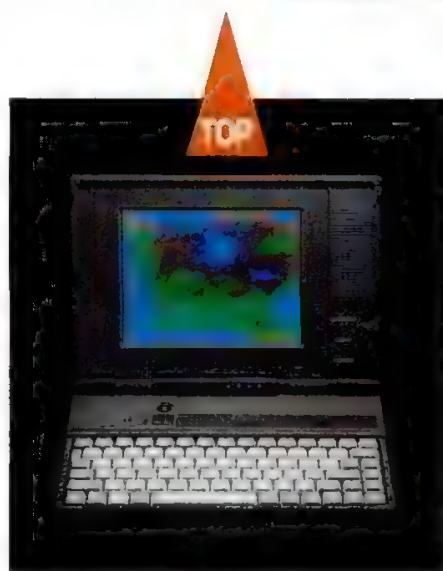
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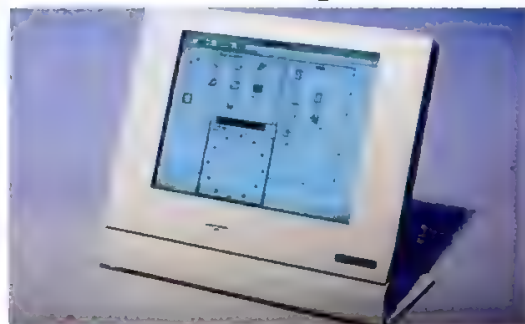
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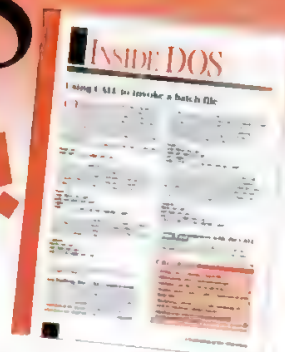
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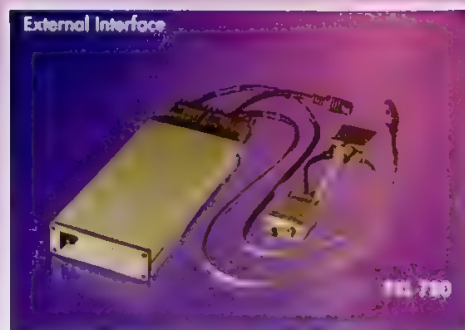
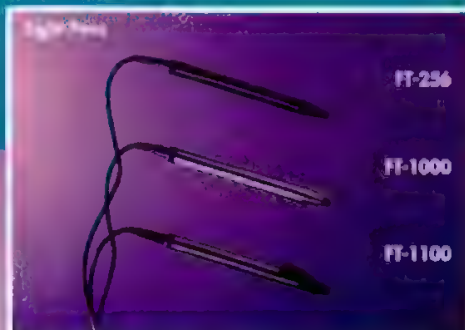
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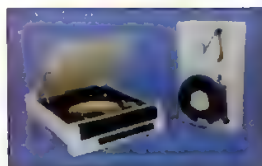
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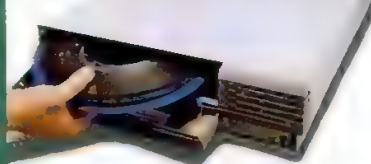
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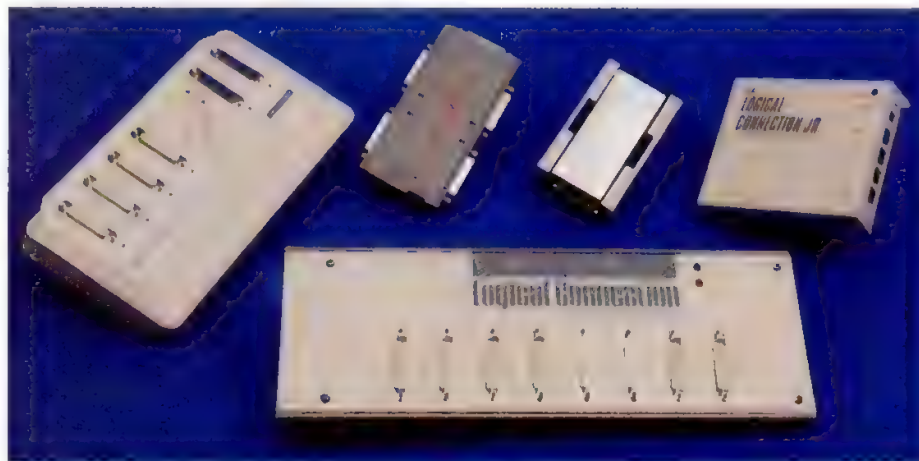
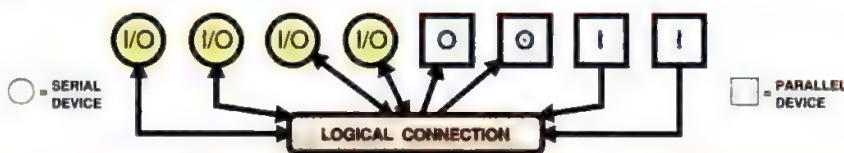
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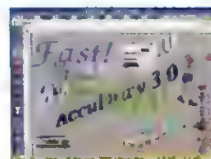
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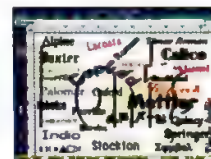
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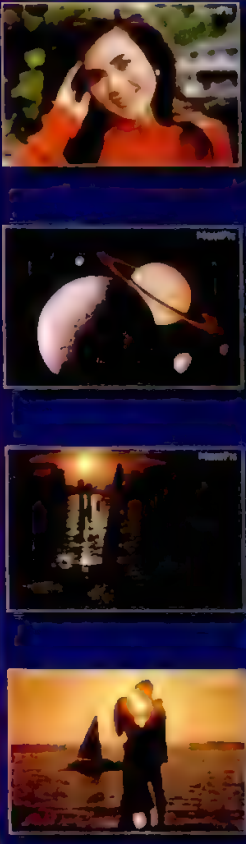
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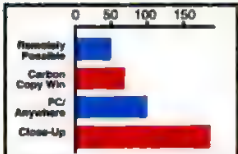
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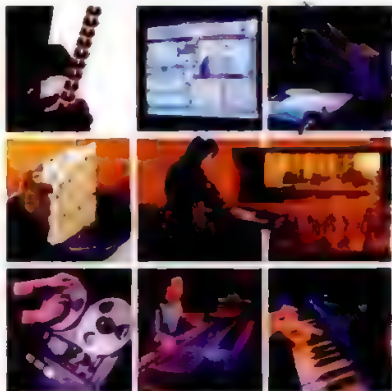
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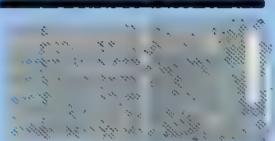
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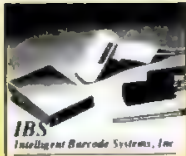
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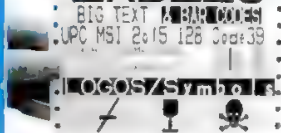
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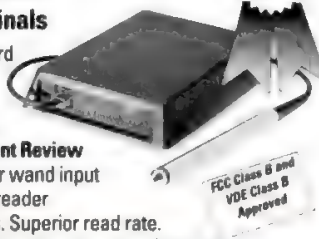
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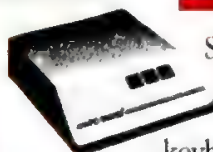
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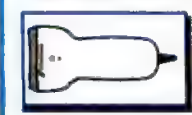
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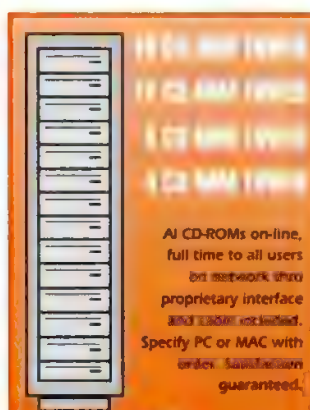
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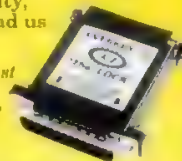
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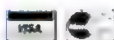
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tant to you if you're ever planning to buy additional equipment or software. Even just one peripheral.

What the editors reported

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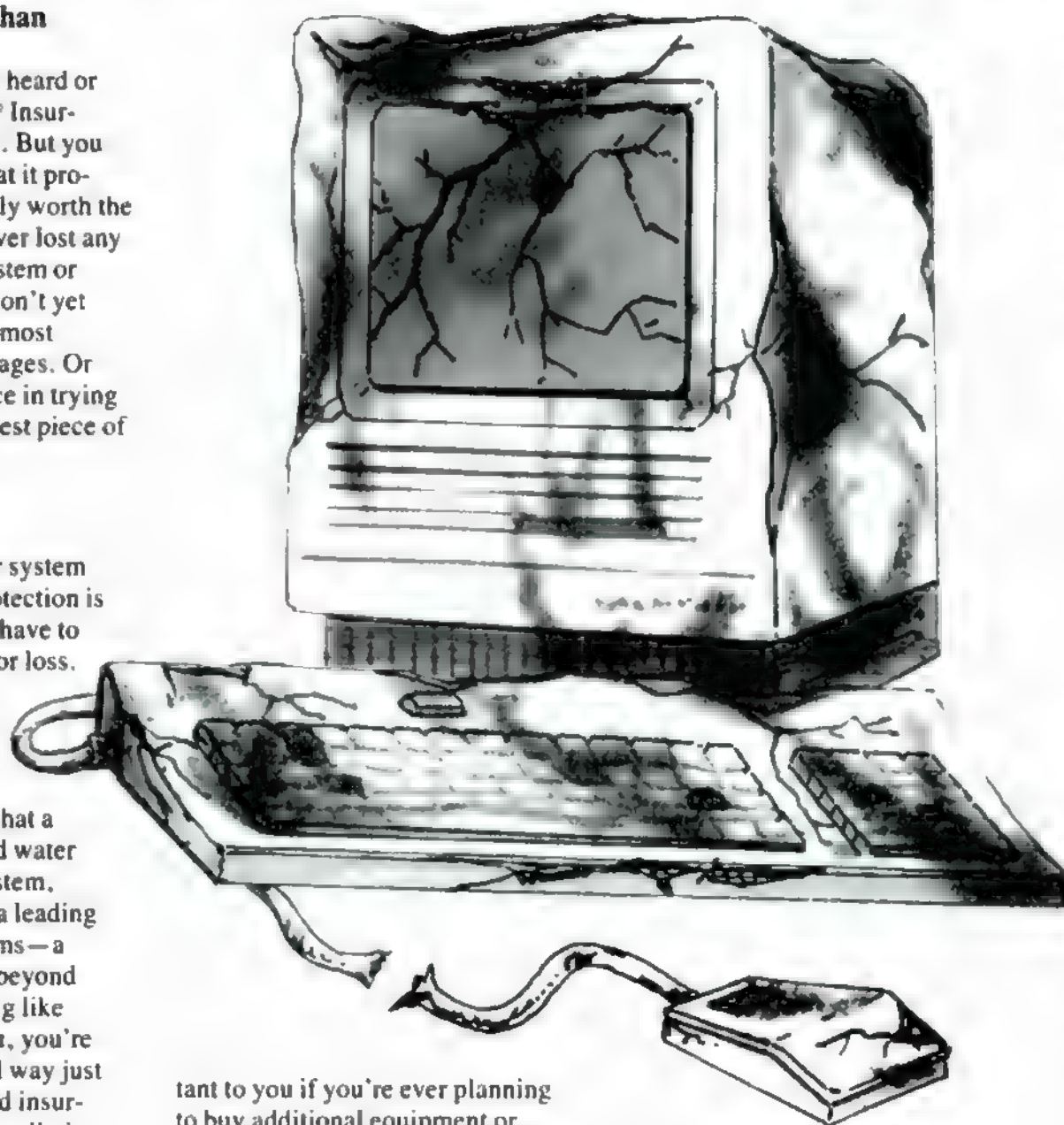
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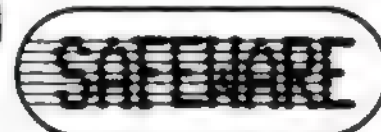
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4. Is your company a reseller?
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5. For how many IBM PCs and compatibles do you specify brands of products?

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02. ☐ 11-25 04. ☐ 100 or more

6. Are there any PCs in your office? (Check all that apply.)

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03. ☐ Networked together

7. Please check the equipment currently installed at your location. (Check all that apply.)

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04. ☐ Macintosh
05. ☐ CD-ROM
06. ☐ Windows

8. Do you plan to buy any PC products?

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02. ☐ In 4 to 6 months 04. ☐ No definite plans

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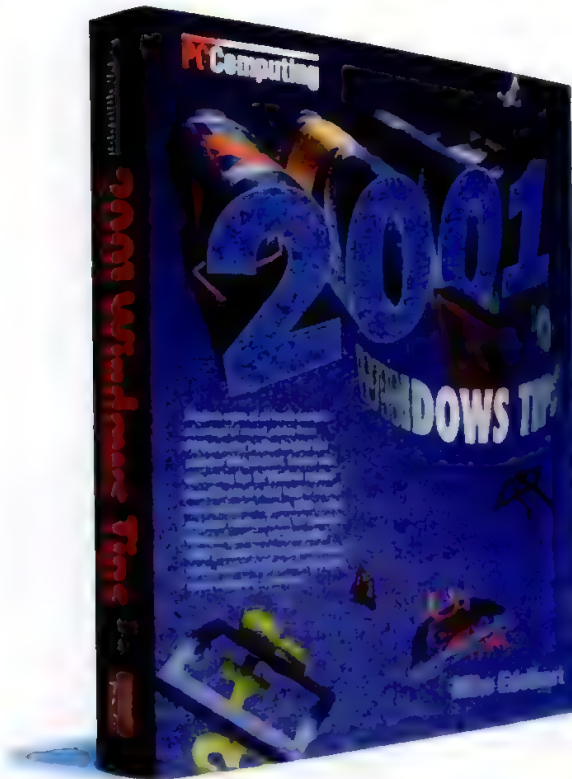
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Coming Up

Low-Cost, High-Performance PCs

If \$2,000 is the most you want to spend on a personal computer but you don't want to compromise on features and performance, take a look at *PC Magazine's* latest reviews of over 60 systems. *PC Magazine* uncovers the ways manufacturers are keeping costs down—from limiting a system's future expandability to cutting corners on component quality. But while some systems emerge with pleasant surprises, others present significant compromises. We review systems not only from the value line products of industry leaders, such as Compaq, Dell and IBM, but also from single line companies known for steady savings.

Tax Software

These days it's never too early to begin preparing your tax returns. So *PC Magazine* created a shoebox full of receipts and ran the numbers through the Headstart Editions of several tax-preparation packages. Find out who's making the arduous task of tax preparation easier this year. Included in the review are the DOS and Windows flavors of Andrew Tobias' TaxCut, and TurboTax, plus AM-Tax, EasyTax, Personal Tax Edge, Tax-Break, and TaxPerfect.

2-D Drafting Software

For most users, what's the difference between low-cost and high-end drafting software? Is there any? *PC Magazine* tests 2-D drafting and CAD packages with similar feature sets, ranging in price from \$199 to \$3,995. We'll help you determine where to get the most bang for your architectural, mechanical, or drafting buck.

Making Connections

On-line services are no longer just the haunts of PC mavens who are savvy and bold enough to brave the Hayes command set. Graphical systems and new, easy-to-use front-end software are making on-line services easier than ever to access. Next month we look at the wealth of offerings on America Online, CompuServe, Delphi, GENie, and Prodigy.

Free Utility

It's almost inevitable that with just normal usage, the files on your hard disk will become fragmented. While fragmentation won't cause you to lose data, it can dramatically slow down disk accesses. To get your hard disk operating at peak performance, try DEFRAGR, next issue's utility. It will defragment the files on your hard disk quickly and easily. □

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WINDOWS GAMES

Take A Break! Four Game Packs Bring Classics to Windows

BY BARRY SIMON

Quick games are a natural for Windows. What makes more sense when waiting for your spreadsheet to recalc than playing a quick round of your favorite game? In this roundup, we look at game packs from Centron Software, Microsoft Corp., and Symantec Corp.; a collection of three board games from Virgin Games; and two shareware gems from Epic Megagames and Software Excitement.

With few exceptions, such as Microsoft's Entertainment Pack 4, these collections contain electronic versions of familiar pencil-and-paper, card, puzzle, and board games. Most of the games translate well to the screen, taking up less than a megabyte on the hard disk and serving as a good break from Windows work.

CENTRON SOFTWARE INC.

Games Master for Windows

Casino Master for Windows

Gamblers, card players, and puzzle fans have two new elec-

tronic choices from Centron Software. Games Master for Windows (\$49.95) includes three solitaire variants, blackjack, dominoes, and several geometric puzzles. Casino Master for Windows (\$79.95) contains five Las Vegas classics.

Games Master's card



Games Master for Windows: With dominoes and cards, this package presents dozens of variations of solitaire.

games include three versions of solitaire: Pyramid, Yukon, and Addit. Pyramid and Addit are addition games; you clear the board by making pairs that total 10, 11, 12, or 13. Yukon is a Canfield variation, with seven stacks of seven cards each, four face-up and three face-down. The games' object is to move all the cards, in order, to the top row. In blackjack, you play against the house. This version offers no suggestions for betting or tips

on playing the game.

Games Master also features some familiar puzzles. In Slider, you must slide 15 numbered blocks around a four-by-four grid into their proper order. There are eight variations of this puzzle, including linked ellipses, a maze, and a Picasso painting. A second variation of this puzzle is Gridloc, which most closely resembles the Klotski game included in Microsoft's Entertainment Pack 2. Like Klotski and Slider, you must slide blocks into place. But the blocks are different sizes, so they are harder to move around. Gridloc contains 20 different puzzles.

Two additional puzzles require you to fill a large grid with blocks of various shapes. Both Pents and Checkerboard have 24 different grids to fill; in the latter, the shapes must form a black-and-white checkerboard pattern.

Rounding out the collection is a dominoes program with two solitaire-style games, a puzzle, and a strategy game that pits you against the

computer. The solitaire games involve a degree of luck, but the puzzle and strategy games require skill and planning; the more you think ahead, the better you'll do.

These games have a number of common aspects. All but the blackjack game are difficult—some devilishly so. They have an attractive look and are, for the most part, well put together. One annoyance: Seven of the nine games must be played full-screen in order to see all the cards, dominoes, or shapes. Yet the games don't load full-screen. You have to hit a maximize button before you begin. Despite this small aggravation, Games Master is the best alternative to Microsoft's Entertainment Pack series.

CASINO MASTER FOR WINDOWS

The \$79.95 Casino Master for Windows contains the same style interface as Games Master and covers all the options in a well-designed, attractive package. But unlike Games Master, this package provides more than a quick break; the craps, baccarat, video poker, roulette, and blackjack pro-

grams will prepare you for your next trip to Las Vegas. The program teaches you the basics of each of the five games and offers advice, odds, and betting strategies.

Blackjack and baccarat support up to three players against the house; blackjack also gives advice on when to hit, stand, split, or double down.



Casino Master for Windows: Learn the rules of craps and four other casino games without risking the cash.

Casino Master

The craps program gives you thorough instructions and even contains context-sensitive help: Hold down the Shift key, click on a section of the table, and a description of that section appears. Roulette and video poker give odds but little instruction; both are mostly games of chance.

Though gambling without real money is a rather pale pastime, it does give you the opportunity to learn the rules and intricacies of each game without significant risk.

Games Master for Windows, \$49.95. Requires: 640K RAM, Microsoft Windows 3.0 or later. **Casino Master for Windows, \$79.95.** Requires: 640K RAM, Microsoft Windows 3.0 or later. **Centron Software Inc., 1500 NW 3rd St., Deerfield Beach, FL 33442; 800-848-2424, 305-425-0557; fax: 305-425-0559.**

Circle 458 on reader service card

MICROSOFT CORP.

Entertainment Pack 4

Microsoft pioneered the game-pack model with three earlier offerings. Just as the first two Entertainment Packs had Minesweeper and Pipe Dream as their respective showstoppers, this \$39.95 package has Jezz Ball. Put it only on your home machine

because it can be addictive.

Jezz Ball starts with two balls bouncing in a large rectangular grid. The goal is to make at least 75 percent of the original disappear by trapping the balls in smaller and smaller sections of the grid. Your mouse cursor is a double-headed arrow that toggles from vertical to horizontal with the right mouse button.

Press the left button and the arrow stretches in both directions, dividing the grid in two. Any empty segment disappears. If a ball hits the arrow before it reaches the grid's edge, you lose one of the two lives you had at the game's onset. Each time you finish a level, you get one more ball and one more life.

You score points based on how quickly you complete a level, how many lives are left, and how much of the grid you clear. Jezz Ball is fascinating, wonderful, and fun.

MORE BALLS AND WALLS

Maxwell's Maniac is another bouncing-balls-and-walls game, but it is less inviting than Jezz Ball. In this multilevel game, you try to trap blue and red balls in separate blue and red chambers by moving a sliding gate back and forth between the two chambers so the correct molecules can pass through. The game is inspired by "Maxwell's Demon," an experiment by 19th century physicist James Maxwell.

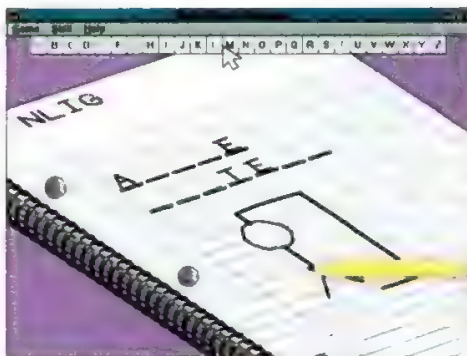
Another gem is Chip's Revenge, in which you work your way through a maze, picking up keys and avoiding traps as you advance through more than 100 levels. If

you fail at a level, you get to try it again. If you exit the game and return later, you start at the last level you completed—unless you start a new game.

Go Figure is a challenging arithmetic game. You are given four numbers, which you add, subtract, multiply, or divide to total a target number. (If you must reach 25 using 3, 7, 8, and 4, for instance, your equation might read $3 \times 7 + 8 - 4$.)

The remaining three games are variations on classic themes. Dr. BlackJack serves as a good tutor; it is standard blackjack with a mode that prompts you on the right strategy.

Tic Tac Drop is a version of



Symantec Game Pack: Pencil-and-paper games with a familiar graphical interface.

Score Four, the vertical tic-tac-toe game in which you can place a marker only in a square directly above a filled one. The electronic version improves on the plastic one by giving you a choice of three playing fields: the classic 8-by-8 square grid, a diamond, and a triangle. The collection of games is nicely rounded out with a surprisingly sophisticated chess game.

Only one possible catch: Two machines on which the game pack was installed experienced nasty crashes. But other systems ran the games without a hitch.

Entertainment Pack 4 sup-

ports multimedia sound and is Microsoft's best game collection. It is also the best of the packs reviewed here.

Microsoft Entertainment

Pack 4, \$39.95. Requires: 1MB RAM, 1.6MB hard disk space, Microsoft Windows 3.0 or later. Microsoft Corp., One Microsoft Way, Redmond, WA 98052; 206-882-8080; fax: 206-936-7329.

Circle 475 on reader service card

SYMANTEC CORP.

Symantec Game Pack

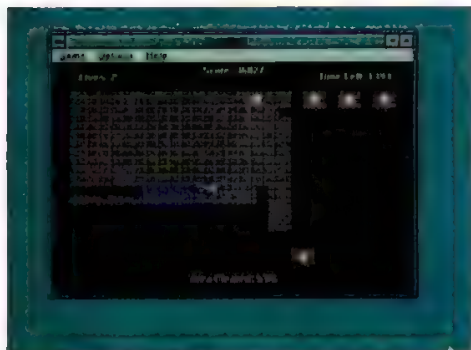
Symantec's first game pack has visual flair but little depth. With the package's odd assortment of childhood favorites, this collection may appeal to

ten-year-olds, but it is likely to become a bore to most other players.

Some games simply don't translate well electronically; here, jacks and pickup sticks are two of them. Neither game is improved by bringing it to the

screen; moreover, most people outgrow these games by their tenth birthdays.

Symantec did a little better with two elementary-school notebook classics: Hangman and Dots (dubbed "Smart Dots" in this iteration). Both games feature a notebook drawn on screen; a visual pencil fills in the letters, the hanged man, and the lines between the dots. During our review process, I came across a bug on one machine (which may be attributable to the screen driver): Picking "New Game" sometimes failed to erase the last game. The screen became impossible to



Entertainment Pack 4: A surefire productivity buster, Jezz Ball challenges the player to stop after one game.

Symantec Game Pack

read until I exited and re-entered the game.

Two memory games may appeal to some older players. In Code Breaker, you must crack a code in as few moves as possible. Memory Blocks is a version of concentration featuring pairs of pictures to match. You can play against the computer or against a human opponent.

Though the games are attractive, most of them are better suited to pencil and paper than to a computer.

Symantec Game Pack, Version 1.0, \$39.00. Requires: 1MB RAM, Microsoft Windows 3.0 or later.
Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014;
800-441-7234, 408-253-9600;
fax: 408-252-4694.

Circle 476 on reader service card

WINDOWS BOARD GAMES

Monopoly, Risk, and Scrabble

Get Windows Treatment

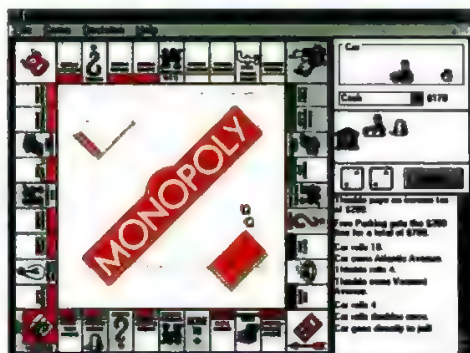
BY BARRY SIMON

Virgin Games has faithfully reproduced three classic board games for Windows: Monopoly, Risk, and Scrabble. Like their nonelectronic counterparts, these games don't qualify as quick ones; however, each lets users save the board and play at their convenience.

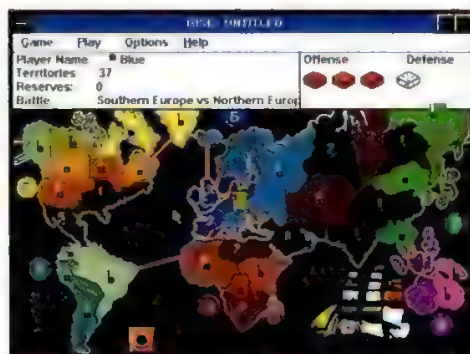
The games bring to the originals the advantages and disadvantages of electronic play. Users can play against the computer or other players. Of course, the extent to which it is possible to play against others without awkwardness depends on the game. Scrabble, where it matters if you can see your opponent's hand, is the hardest to play. Though tiles can be hidden, players must turn away from the screen when their opponents are up. The only closed information in Risk are the cards drawn; nevertheless, playing with others is of-

ten awkward. These two games are best played against the computer. The Monopoly game works fine with other players, however. It would be great to have a network and/or modem of Scrabble and Risk.

My favorite of the games



Monopoly Deluxe: Quicker than the board game—and with better sound effects—this rendition is a winner.



Risk: Strategy meets chance in Virgin Games' electronic version of the classic board game.

is Scrabble. The computer can rapidly access a built-in dictionary and makes a quite formidable opponent. Of course, the game also has a cheat mode: Though the Official Scrabble Dictionary is installed, users can add any word they wish.

SEVEN-LETTER WIZARD

The program won't come up with many of the plays Scrabble players delight in, in which you place a horizontal word and make a few vertical words in the process. But it will find long words you've probably never heard of (complete with dictionary definitions) and is a particular wizard at seven-letter words. Users can set a skill level at one to nine. I found the computer could beat me at level six. But the wait was sometimes lengthy, even on a 33-MHz 486. At levels one, two, and three, I was sure of winning. Levels four and five made for interesting games. Scrabble includes hints, as well as anagram and crossword lookup, two features that let users search for words.

Risk is the hardest game to adapt to the computer. It has three skill levels, but even at the highest, it was too conservative to do well against my onslaughts. Still, its ebb and flow was fun to watch, and I found myself challenged even by the rounds I expected to win.

Monopoly Deluxe for Windows is spectacular in its use of sound



Scrabble: A wizard at finding and defining words you've never heard of.

and animation. Virgin took the time to give each playing piece a sound and personality of its own. The car roars to its destination; the thimble quietly taps around the board. When users go to jail, the siren-paddy wagon comes, and when that hotel is finally placed, an animated wrecking ball bounces on the house and a steam shovel finishes the job.

While Monopoly defaults to the official Parker Brothers rules, users may choose the options they've always played with. Players can collect fines when they land on Free Parking or double their salaries when landing on Go, for example. Monopoly is lots of fun; users will find this to be an excellent enhancement of the real thing.

The games are now available as separate packages only, but Virgin has plans to release a bundle of the three-some later this year.

Risk for Windows, \$49.99, Scrabble for Windows, \$49.99, Monopoly Deluxe for Windows, \$59.99. Requires: 2MB RAM, Windows 3.0 or later; 1.5MB (Risk), 4.5MB (Scrabble), or 5.5MB hard disk space (Monopoly).
Virgin Games Inc., 18061 Fitch Ave., Irvine, CA 92714;
800-874-4607, 714-833-8710;
fax: 714-833-8717.

Circle 459 on reader service card

SHAREWARE

Two Inexpensive Windows Gems

BY BARRY SIMON

Nothing captures the imagination like a beautiful bauble, and jewels make a fanciful motif. Castle of the Winds and Jewel Thief are gems in their own right: challenging, fun to play, and shareware.

CASTLE OF THE WINDS

Castle of the Winds (\$25) is a fantasy role-playing game with simple iconic graphics and considerably greater sophistication than the original Unix version.

In this game, you use your strength, intelligence, constitution, and dexterity as you wend your way through 11 lev-

els of dungeons and avenge your adopted parents' death. As the game progresses, you pick up spells, magic jewels, and scrolls to help you out. Along the way, you'll also run across ogres, goblins, ghosts, giants, dragons, and trapdoors, among other perils. You'll need to save the game often, as it is quite easy to get killed.

Castle of the Winds is a two-part adventure. When you send in your registration fee, you receive the second half, "Lifthransir's Bane." Those looking for fancy graphics should go elsewhere, but if you're in the mood for a great adventure, you will love this game.

JEWEL THIEF

Jewel Thief (\$10) is a quick, fun game with interesting graphics. The playing field is a rectangle with a background that changes at each level. Each level features a different group of jewels to steal. Once you have picked up all the jewels at a current level, you progress to the next.

On each level, a different group of creatures chases you. The chasers appear as icons bouncing off the edges of the playing field, and your cursor has to avoid them. You start out with nine lives and lose one each time you are caught.

This is a simple game, and you will be able to run through



Jewel Thief: On level three, you are chased by camels as you try to steal sapphires.

a round in a few minutes. □

Castle of the Winds, \$25. Epic MegaGames; 10406 Holbrook Dr., Potomac, MD 20854; 800-972-7434.

Circle 477 on reader service card

Jewel Thief, \$10. Software Excitement, 1426 Brookfield, Ann Arbor, MI 48103; 800-444-5457.

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MOVING?

Please write to: PC Magazine, P.O. Box 54093, Boulder, CO 80322. Include your mailing label from a recent issue of PC Magazine for faster service. Please allow up to 60 days for change of address to take place.

Abort, Retry, Fail?

THE LIGHTER SIDE OF PERSONAL COMPUTING

By Robin Raskin

When They Fall Down, Say Oops!

This ad from Amzioid, a vendor of software and hardwood toys in Stow, Massachusetts, touts that its Objects inherit properties from the wooden building block, with attributes scaled for the desktop, with up to ten subclasses and each bag containing multiple instantiations.



BUZZWORD

projectorware The stuff that exists before vaporware.

First heard: Larry Louke, senior engineer at IBM, in a conversation about the future of OS/2. (No, he wasn't talking about future versions of OS/2.)

SWAG research Stupid Wild-Assed Guess; research that doesn't quite have the numbers behind it.

First heard: Dan Ness of Computer Intelligence.

voodoo computing "Standing on one foot, baying at the moon, and hitting the Enter key."

First heard: Leslie Bixel of Adobe Systems.

Truth Is Stranger than Fiction

"Hacker Denies Ruining Computer Files: Sonoma man allegedly destroyed ex-wife's system with virus." A computer hacker is in trouble with Sonoma County authorities for allegedly destroying his ex-wife's computer system with a virus, leaving only an acerbic limerick on her screen."

—SAN FRANCISCO CHRONICLE, DECEMBER 3, 1992

If your entry is used in Abort, Retry, Fail? we'll send you \$50 and a PC Magazine T-shirt. Winners this issue: Sheryl Canter (Objects R Us), Bob Richard (8,000-kps data entry), Christopher Barr (hacked-up ex-records), Joseph Weesner (powerfull spell-checker).

What About a Spell-Checker?

"Ami Pro is filled with powerfull word processing features that are not included in the Working Model."

—INSTALLATION SCREEN FROM THE WORKING MODEL OF AMI PRO 3.0

10 YEARS AGO IN PC MAGAZINE

Many users may have called Jack S. Hawley's \$415 X063X "The Rolls Royce of mice" back then, but today we'd probably call it a brick.



Oxymorons to Live By

Military intelligence, jumbo shrimp. . . we at PC Magazine have a few of our own:

User-friendly wars
Proprietary standard
Huge market niche
Buggy virus

ARF

Interactive

Choose one from column A and one from column B and name the next Pen-based system of 1993.

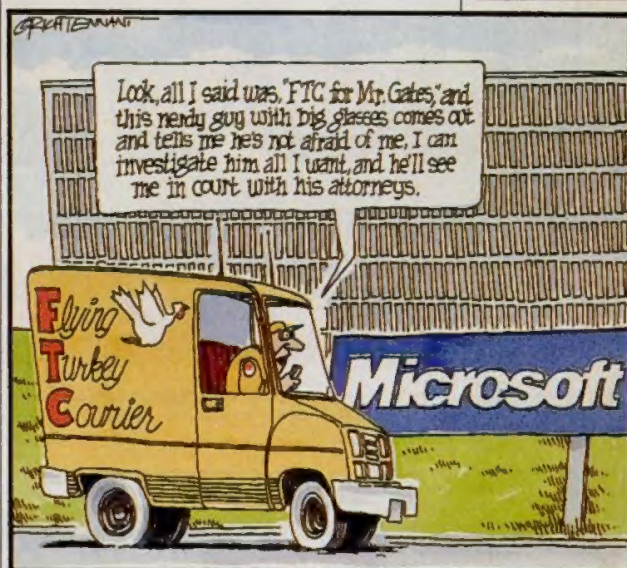
Touch	Board
Stylus	Book
Sketch	Box
Script	Folio
Quill	Form
Press	Master
Point	Mate
Pen	Note
Palm	Pad
Note	Pal
Nib	Paper
Ink	Point
Info	Right
Hand	Screen
Finger	Slate
Executive	Tablet
Etch-A-	Top
Draw	Ware
Chalk	Write
Auto	-N-Go

DAIRY FARMER, Reliable and exp. milker. Ed Swartz Farms, Castleton NY.

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Source: Reliability Ratings™, 1992 PC Vendor Survey									
SERVICE		TECHNICAL SUPPORT		PRICE		RELIABILITY		UPGRADEABILITY	
1. DELL	(8.62)	1. DELL	(8.06)	1. DELL	(8.57)	1. DELL	(8.06)	1. DELL	(8.52)
2. APPLE	(8.08)	2. IBM	(7.89)	2. COMPAQ	(8.07)	2. COMPAQ	(8.95)	2. APPLE	(7.64)
3. IBM	(8.01)	3. APPLE	(7.75)	3. APPLE	(8.56)	3. APPLE	(8.58)	3. COMPAQ	(7.48)
4. COMPAQ	(8.35)	4. COMPAQ	(7.71)	4. IBM	(8.01)	4. IBM	(8.54)	4. IBM	(8.91)
								FUNCTIONALITY	
								1. DELL	(8.72)
								2. COMPAQ	(8.43)
								3. APPLE	(8.43)
								4. IBM	(7.88)
								MONITOR	
								1. DELL	(8.31)
								2. APPLE	(8.08)
								3. COMPAQ	(7.43)
								4. IBM	(7.38)
								OVERALL SATISFACTION	
								1. DELL	(8.77)
								2. COMPAQ	(8.48)
								3. APPLE	(8.14)
								4. IBM	(7.88)

Survey was independently conducted by Reliability Ratings, Inc., a subscriber-based research firm that does business with most of the FORTUNE 500®.

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